The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Annual Spring Issue

THE annual spring number of THE CHEMICAL AGE, issued this week, should be of special assistance to chemical manufacturers and merchants in bringing them in touch with overseas buyers, large numbers of whom have no specific knowledge of British products and British firms. Of the commercial value of a link of acquaintance between the producer at home and the purchaser abroad we have had many examples, and the number of potential users who are vainly seeking the names or addresses of manufacturers of chemical products or further particulars about products and plant of which they have vaguely heard is surprisingly large. Last week we published an interesting case in which a Government chemist in the Malay States, realising the scope for new uses of silicate of soda in the rubber and allied industries, wished to get in touch with British manufacturers. We have just had from the technical director of one of the greatest chemical organisations in the United States inquiries about the recent chemical engineering papers presented by Mr. Oscar Brunler and Mr. David Brownlie respectively on the Brunler internal combustion boiler and steam generation under critical conditions. The information is already on the way to the inquirer, probably with satisfactory results on both sides. Scarcely a day passes without inquiries coming in concerning something or other which has been referred to in a previous issue, and quite a number are from distant parts of the Empire where, naturally, new fields are constantly being opened up. The missing of this large community of potential customers must represent, to those who take no steps to communicate with them, the loss of a considerable bulk of possible business in a year.

Effluent Liquors

OUR remarks last week on the vexed problem associated with the disposal of effluent liquors resulting from chemical processes have prompted a reader to remind us of the work which was conducted by the Chief Inspector under the Alkali Acts in connection with the matter, and of which a full account is given in the Alkali Reports for the years 1921 and 1922. On the larger works the spent liquor from ammonia stills, with its heavy content of insoluble compounds, demands the introduction of more or less elaborate settling bays and filter-pressing arrangements. It is however, small producers, such as we referred to last week, who predominate so far as liquor distillation in this country is concerned, and it is they who have to seek means of disposal involving less outlay on plant. In suggesting that the matter might in nearly all cases be one for accommodation between the liquor distiller and the local authority, we are well aware of the fact that such authorities, when once they start to interfere with private enterprise, frequently show an amount of persistence which is in inverse proportion to their importance. The industrial chemist has in some cases, therefore, been led to regard them as far more obnoxious than the waste liquors of which he is anxious to dispose.

Nevertheless, the powers that be must be satisfied and obeyed; and, as our correspondent points out, Dr. T. Lewis Bailey has gone a long way to indicate the lines upon which placation should proceed, although we are still of the opinion that the methods of purification which he has suggested involve expenditure which would be extremely hard on the small producer, who already finds but little margin of profit in the sulphate of ammonia process. In the first place, the most objectionable constituent of these particular effluent liquors is phenol, so that the elimination of this compound before the liquor is finally discharged from the works should materially contribute towards remedying matters. Phenols may be removed by steam distillation, so that an obvious method with which to attempt their elimination is that of passing the spent liquor down a tower in counter-current with hot fire gases blown upwards through the tower by

means of a steam injector. Such treatment, however, although undoubtedly effecting the removal of the bulk of the phenol, has no decolourising action, so that purely sentimental objections to the effluent may still remain. Carbon dioxide as a decolouriser has not proved itself effective, but the desired effect may be obtained by the addition of a small proportion of mineral acid, the quantity demanded depending upon the thoroughness with which the distillation process is carried to completion with a minimum excess of free lime. It is at least useful to remember, when faced with an obstinate attitude by the local authority, that this dual treatment is capable of giving a deodorised and practically colourless effluent the admission of which to the sewers could not possibly be objected to.

The Problem of "Devil-Liquor"

WHILE dealing with the question of effluent liquors there is a note of warning which in these days of such punctilious attention to detail it is scarcely necessary to utter, but we do remember having come across misguided individuals who have disposed of the " devil-liquor " from their distillation plant by running it to waste with their effluent liquor. This particularly obnoxious condensate is, of course, deposited in liquor preheaters in those plants where the exit gases from the saturator are passed to these preheaters before reaching the sulphuric acid plant or oxide of iron purifier. It is, of course, essential that proper steps should be taken for the collection and subsequent treatment of " devil-liquor," although there certainly seems no definite opinion as to the best means of disposal. Most certainly, though, it must not be permitted to flow away with the ordinary effluent. At many works the " devil-liquor " is merely run back to the ammoniacal liquor storage tank, being subsequently re-distilled ; but it was, we think, Mr. Parrish who, in a paper he read some two years ago before the Society of Chemical Industry, suggested that this practice presents disadvantages. In the first place, expense is entailed in the way of steam required for distillation, while many of the impurities in the original liquor which are concentrated in the " devil-liquor " (*i.e.*, pyridine, creosote oil, naphthalene, etc.) are again introduced into the saturator. If the production of a white sulphate of ammonia of good appearance is aimed at, it is very essential that such impurities should be disposed of in another way and not be re-circulated with the liquor. Apart from this fact, the distillation of " devil-liquor " represents something approaching a 20 per cent. reduction of still capacity. " Devil-liquor," in fact, would seem to provide quite an intriguing little problem for the sulphate of ammonia producer.

Grading of Sulphate of Ammonia

IN a recent article in a contemporary the grading of sulphate of ammonia is discussed, and it is suggested that the grade or size of the crystal most suited to agricultural requirements has not yet been defined by the industry, beyond the general indication that dust or flour is disliked and crystals preferred. We agree that this definition is elastic ; indeed, so much so that in an editorial note in our issue of December 27 last we discussed the matter in some detail, and attempted to give a lead to the industry by affording particulars of what might be regarded as a suitable standard. We were careful not to confine our examination of the screening characteristics of dry neutral sulphate to one or two makes, although we did note with interest the average characteristics of the best sulphate produced. In affording a guide consideration was given to good makes in relation to what might be termed second rate, because it was appreciated that a standard must not be too onerous, otherwise it would exclude many productions and would lose the value it otherwise possessed.

We do not, of course, go so far as to suggest that any makes falling short of the standard indicated should be rejected as unsuitable for use by agriculturists. Rather is it to be urged that a general improvement in the crystal size of dry neutral sulphate of ammonia should be aimed at, and the standard for the present should be on the lines of that which we have defined. As knowledge and experience of the conditions necessary to ensure the production of coarser crystals extend, it is proposed that the standard should be raised until it reaches the limit of size beyond which no material gain would accrue to the farmer or agriculturist. It is to be hoped that the British Sulphate of Ammonia Federation will give careful consideration to what has been suggested, and that some recommendation on the matter will be made to their various members.

The Beet Sugar Industry

THERE is considerable activity in the matter of beet sugar at the moment. Indeed, the development of this industry has to some extent become a party cry, and a State subsidy of an unprecedented character has been granted. Works are being erected at Spalding, Colwick, near Nottingham, Kidderminster, and Ely ; factories are already operating at Kelham and Cantley, and the erection of a works at Yeovil is contemplated. If the beet sugar industry is to establish itself permanently in this country it is essential that there should be some co-operative or co-partnership arrangement between the farmers on the one hand and the refiners on the other. The farmers, for instance, must not attempt to sell beets with adhering dirt. On the other hand, the sugar works must encourage the growth of beet, and there must be no suspicion that there is an attempt to extort the last pound of flesh from the farmers. A reasonably conceived co-operative, or co-partnership scheme would undoubtedly ensure smooth working between the two parties concerned.

The beet sugar industry is essentially a chemical industry. Special fertilisers have to be used, apart from deep ploughing, if a maximum crop of beet is to be obtained, and the refining process is also a chemical process. There appears to be a diversity of opinion whether animal charcoal should be used as a purifier and decolouriser, or whether carbons of vegetable origin should be used. In some works the sulphur dioxide bleaching process is still operated, but whether it gives results as good as animal charcoal, or even vegetable decolourising carbons, is open to doubt.

A White Paper has recently been issued by the Ministry of Agriculture suggesting the erection of a complete small scale plant based on the De Vecchis process, and it is recommended that such plant should embody improvements calculated to ensure efficient desiccation and defecation. This seems to suggest that there is scope for greater purity, and that the highest sucrose content has not yet been reached. Meanwhile, further information relating to the De Vecchis process will be awaited with keen interest.

Chemicals at Wembley

WHATEVER happens in other departments at Wembley this year, industrial and scientific chemistry are already assured of worthy representation. As explained more fully elsewhere, the chemical exhibit will occupy the same excellent site as last year, and is likely to have an even more widely educational effect than last year. In addition to the individual stands there will be three collective exhibits, with striking models, illustrating the application of tar to road construction, the dyestuffs industry, and the chemical plant industry. The scientific section will also be broadened out, and special attention given to three branches—coal, salt, and food—with the view of showing the public the importance of these industries, and the main processes from the raw material up to the final products and by-products. The Association of British Chemical Manufacturers, which is again responsible for the organisation, is to be congratulated on having successfully completed the provisional arrangements at so early a date, and the exhibitors equally on the loyal support they are giving the Association for the second time.

Chemical Traders' Grievances

THE statement of policy which the chemical and dyestuff traders presented at their annual meeting on Wednesday constitutes a very vigorous defence of the merchant's place and function in industry, and an equally vigorous criticism of the conditions under which at present they are trying to carry on import and export trade. Some small but appreciated concessions have been obtained in the course of negotiation, but on many points of procedure—notably on the disclosure of customers' names to the Dyestuffs Licensing Committee, the holding up of goods for analysis, and the system of fixing the *ad valorem* duty—the Association has failed to convince the authorities and its members suffer under a sense of grievance. This comes out very clearly in the reference to the policy of manufacturers towards the merchant interest. and to the attitude of the Government departments which the traders continue to view, from their standpoint, with suspicion. We imagine that in their hearts all merchants desire a system of free imports, for any legislative restriction of freedom naturally hampers their operations, and even the most perfect machinery cannot remove this fundamental objection. Their point, however, is that the administrative methods should not add to the statutory disabilities or travel beyond the purpose and intention of any safeguarding or similar Acts, and the protests at Wednesday's meeting show that they are still far from satisfied on this point.

Points from Our News Pages

An illustration is given of "Bouverie House" the magnificent building, now in course of erection, which will be the future headquarters of Benn Brothers, Ltd., and Ernest Benn, Ltd. (p. 292.)

A letter is published on "The Disposal of Effluent Liquors," by "Distiller," and the points raised therein are the subject of editorial comment (p. 293).

A specially compiled illustrated article showing the possibilities of the post-war European markets for chemicals should prove of practical interest to all concerned with export trade (p. 294).

The conference of chemical engineers dealt with the subjects of grinding and crushing machinery, and air separation (p. 297).

Following a recent article on the origin of the Hardinge Mill, details and developments are now recorded and illustrated (p. 300).

Practical facts and figures dealing with employment in the chemical trade (p. 303).

A report of the annual meeting of the British Chemical and Dyestuffs Traders' Association includes references to the policy of the Association (p. 304).

Sir Ernest Benn contributes an article that sets forth the undoubted advantages of the trade and technical Press as advertising media (p. 306).

The death is announced of Mr. H. E. Jones, a prominent figure in gas and gas engineering circles (p. 311).

The London chemical market remains fairly steady with a slightly improved turnover (p. 316).

Our Scottish chemical market reveals moderate business, and prices generally steady (p. 319).

Latest oil prices at London and Hull are given (p. 319).

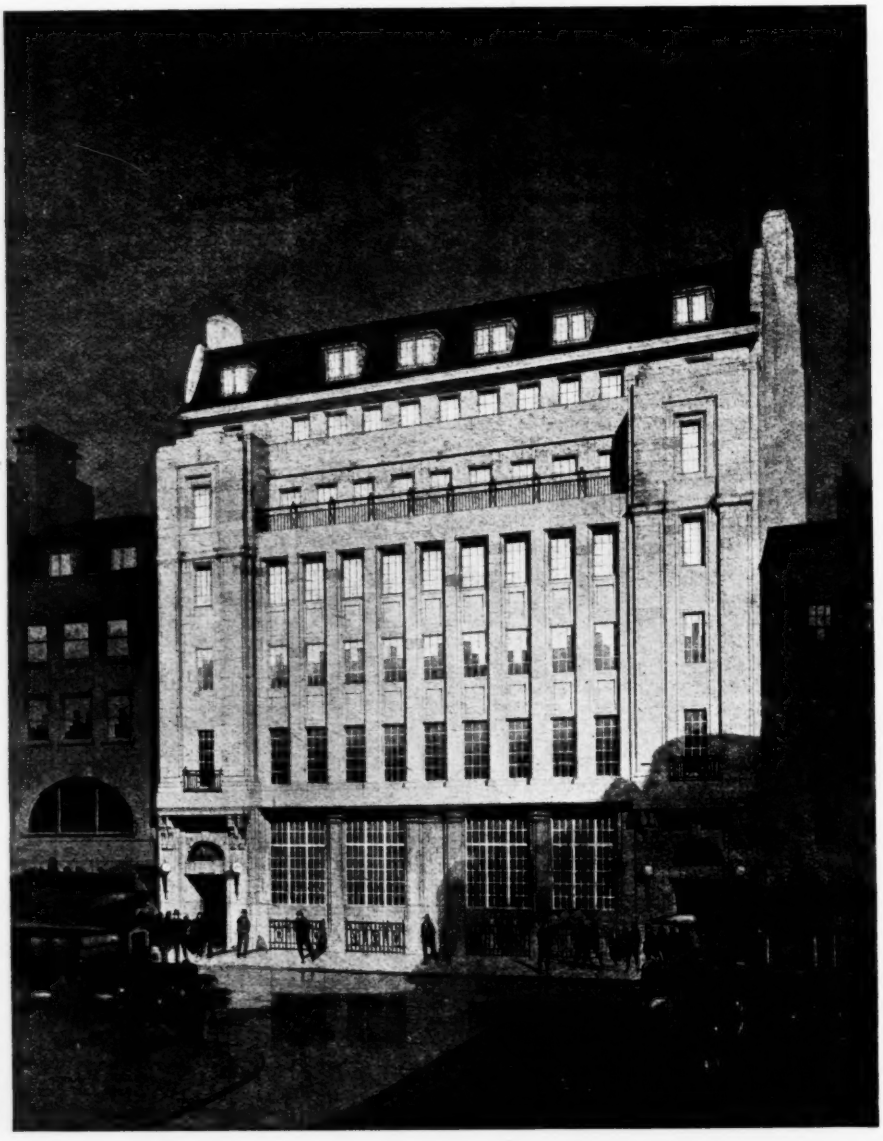
The Calendar

1925		
Mar.		
31	East London College: Conversazione. 7 p.m.	Mile End Road, London, E.1.
31	Society of Chemical Industry (Birmingham and Midland Section): Annual General Meeting. "The Inorganic Constituents of Coal." Dr. R. Lessing.	University Buildings, Edmund Street, Birmingham.
31	Hull Chemical and Engineering Society: Presidential Address—"Modern Engineering Development."	Grey Street, Park Street, Hull.
Apr.		
1	Society of Public Analysts: Papers by W. Dickson, J. C. Drummond and G. D. Elsdon. 8 p.m.	Burlington House, Piccadilly, London.
2	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
2	Royal Institution: "Chemical and Physical Effects of Light." T. Thorne Baker. 5.15 p.m.	21, Albemarle Street, London.
3	British Association of Chemists: "The Profession of Chemistry." Dr. E. F. Armstrong. 7.30 p.m.	Queen's Hotel, Birmingham.
3	Society of Chemical Industry (Manchester Section): Annual General Meeting. "Smokeless Fuel and Oil." Dr. C. H. Lander. 7 p.m.	Textile Institute, 16, St. Mary's Parsonage, Manchester.
3	Society of Dyers and Colourists: Annual Meeting. 6 p.m.	Great Northern Victoria Hotel, Bradford.
6	Society of Chemical Industry (London Section).	Burlington House, Piccadilly, London.
7	Institute of Metals (Birmingham Section): Annual General Meeting. 7 p.m.	Chamber of Commerce, New Street, Birmingham.
7	Hull Chemical and Engineering Society: Annual Meeting. 7.45 p.m.	Grey Street, Park Street, Hull.
9	Oil and Colour Chemists' Association: "Some Problems of the Paint and Rubber Industries." B. D. Porritt.	8, St. Martin's Place, Trafalgar Square, London.

"Bouverie House"

London's Latest Office Building for Benn Brothers, Ltd.

THE CHEMICAL AGE, in company with the other well-known publications of Benn Brothers, Ltd., and Ernest Benn, Ltd., will, in the near future, be removed to "Bouverie House," 154/160, Fleet Street, London, E.C.4. "Bouverie House" is London's most recent landmark. It is half-way up Fleet Street, facing Bouverie Street, midway between the Law Courts and St. Paul's Cathedral. This new building is on the north side of the direct route to the City, and it is doubtful whether there is, for business purposes, a finer address in London. The building consists of a ground floor and basement and six upper floors containing over 40,000 sq. ft. of actual office accommodation. The architects, Campbell Jones, Sons and Smithers, who have during the past few years designed many of the largest banks and blocks of offices in the City of London, were selected to develop the site on account of their great reputation for and experience of buildings of this kind. In construction, general planning, lighting, heating, ventilation, lift accommodation and sanitation, "Bouverie House" will represent the latest practice.



The environs of "Bouverie House" are rich in literary associations. Samuel Johnson compiled his dictionary close by at number 17, Gough Square, and lived for years in Bolt Court. In Wine Office Court, Goldsmith earned a precarious living, and at the "Cheshire Cheese" the favourite seats of Johnson and Goldsmith are still pointed out. Charles Dickens, as the first editor of *The Daily News*, was also associated with Bouverie Street. "Bouverie House" is a great block of modern offices in the very heart of the newspaper world, where any happening of importance in any part of the world is known a few minutes after its occurrence.

Indian Chemical Industries

Conditions in the United Provinces

(From a Correspondent.)

During the past year in the United Provinces there seemed to have been no improvement in the position of fundamental chemical industries. The out-turn of saltpetre declined considerably. D. Waldie and Co. are the largest manufacturers of sulphuric acid in the province, and they and the Indian factories at Rawatpur, Benares and Gaziabad do not turn out more than 3,000 tons of sulphuric acid. The Stores Purchase department arranged for the purchase of chemicals from indigenous factories for the use of Government departments.

Shellac

Shellac prices, which are subject to sharp fluctuations, were weak, and during the year came down to 134. Stability in price will only be possible when sufficient demand for shellac is established in the country and the province for industries such as paints and varnishes. A demonstration factory would be useful for disseminating better knowledge of manufacturing processes, but manufacturing factories can only spring up if the supply of the raw material, which is at present very irregular, is constant and systematic. Landowners can rescue the industry by undertaking extensive cultivation of lac on scientific lines It would pay them to do so even under the most unfavourable trade conditions.

Soap

It is gratifying to note that soap factories are being gradually established at places outside Meerut, though that place leads in the matter of quality and quantity. A new factory, under the name of the Jainica Soap Works, was started at Cawnpore, which before had no soap factory. Factories at other places are doing faily well, but progress on the whole is slow.

Essential Oils

This industry was again carried on under great disadvantages, though its reorganisation on modern lines continues to receive adequate attention from private enterprise. Large quantities of foreign essential oils and synthetic prefumes were employed by makers of *attar* and like products. Distillation of sandalwood oil was less remunerative because of the great fall in the price of the oil. Patchouli distillation has had a great set-back because it does not pay the distiller up-country to import leaves all the way from Singapore. The whole progress of the essential oil industry turns on a sufficient supply of the raw materials, but this province has practically none of them.

Turpentine and Rosin

The Government turpentine and rosin factory was transferred last year to a private firm. The factory is now in the best of hands, but this important pioneer industry, though it has great possibilities, has to face certain difficulties at present. Sales of both rosin and turpentine have fallen off slightly, although there have been no imports of these commodities into India large enough to menace the Indian industry. There is tendency, increasingly apparent in the case of railways, to employ cheap imported substitutes or turpentine adulterated by bazaar dealers in place of genuine and pure turpentine. This practice will in time prove so unsatisfactory that consumers will return to the use of the genuine " spirit of turpentine " as manufactured in India, or at all events to the use of one of the other two lower grades which have the dual advantage of cheapness and purity as compared with the adulterated bazaar product or imported substitute. One of the outstanding features of trade in the naval stores line was the recent heavy drop in the price of rosin, due to the imminence of importations from both America and the United Kingdom. There is every sign, however, that the low rates at present prevailing in American and Continental markets will shortly rise, and that there will be an all-round hardening of the rosin market.

Katha and Cutch

The Indian Wood Products, Ltd., of Bareilly, made good progress during the year, and are now able to manufacture about 1,000 lb. *katha* and about 2 tons of cutch daily. Katha, which is manufactured in three qualities, is sold at Rs. 110, Rs. 130 and Rs. 175 per maund and is finding a ready market. Cutch is also finding a ready market in foreign countries.

Research and Experiments

The institutions at which important research and experimental work is carried on are the Research Laboratory attached to the Technological Institute and the World-Working Institute, though experimental work on a small scale is done at certain other institutions of the department. New investigations were taken up at the Research Laboratory with the improvement of lime and mortar from Kankar, the manufacture of perfumes from Indian turpentine and the oil contents of oilseeds in the United Provinces, while further investigations were conducted on the refining neem oil, the manufacture of tannin extracts from oak, the yield of alcohol from molasses, the aromatic hydrocarbons in Burma petroleum, and the utilisation of lac dye.

The University of Calcutta is strengthening its Physical and Applied Chemistry Department by better equipping its laboratory at a cost of a lakh of rupees. Among some of the needs of the University, it is said, are plant for experiments in liquid air and wireless equipment, a foundry, and plant for electro-technology.

With a view to assist the prosperous cloth-printing industry located within its borders, as well as round about them, the Masulipatam Municipality in the Madras Presidency has started a well-equipped dyeing school, where students as well as adults will be trained in the improved methods of dyeing and taught the use of indigenous as well as foreign dyes.

In response to the representation of Indian manufacturers, the Government of India contemplate imposing an excise duty on all matches manufactured in India in factories started with foreign capital. This is to meet the competition of certain of the Swedish and Japanese enterprises in India with indigenous manufacturers. S. G. W.

The Disposal of Effluent Liquors

To the Editor of The Chemical Age.

Sir,—I have noted with a good deal of interest the remarks made in the editorial columns of your current issue in connection with the disposal of effluent liquors from sulphate of ammonia plants. My own experience of the freedom of action which is permitted to chemical manufacturers on the Rhine certainly corroborates the statement you make, although one could not, perhaps, go so far as to suggest that the remarkable distinction in colour between the Rhine and the Moselle where the two rivers join at Coblentz—a distinction which is always pointed out as something of a phenomenon to the sightseer—is in any way due to the abuse of the former river.

In this country we would appear to be far more punctilious in dealing with and restricting possible offenders ; but although the law governing the matter is fairly comprehensive and leaves little in the way of loop-holes, it is not usually administered so harshly as to warrant " fear and trembling " (of which you speak) on the part of the would-be manufacturer. It would seem, too, that all possible grounds for complaint on the part of the local authority could be removed by the introduction of the comparatively simple method of treating effluent liquors which was experimented with by Dr. T. Lewis Bailey, the Chief Inspector under the Alkali Acts, at the Hornsey gasworks. Those who are interested in the matter will find a full account of the method employed in the Alkali Reports for the years 1921 and 1922.—Yours, etc.,

March 23, 1925. " Distiller."

[Comment on the points raised by our correspondent will be found in the editorial columns.—Ed., *C.A.*]

Willcox-Fiske Greases

An interesting folder, issued by W. H. Willcox and Co., Ltd., 32–38, Southwark Street, London, describes the various types of Willcox-Fiske lubricating greases issued by the firm, and the special uses for which they are prepared. There are still a surprising number of cases where users prefer grease lubrication on account of the adhesive property of grease and its power of staying in position and of maintaining a layer of lubricant when a machine is at rest.

Most of these are enumerated and the suitability of the various types of lubricant explained. The advice is based on very long practical experience and is the more valuable on that account.

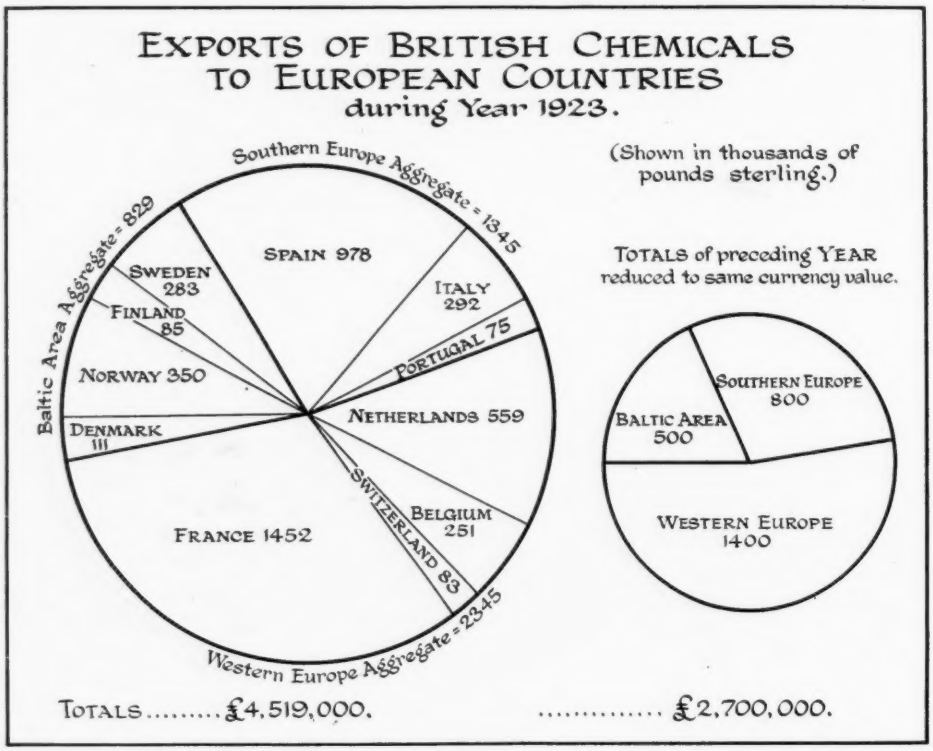
British Chemicals in European Markets

Possibilities of Post-War Trade Conditions

[By Our Statistical Expert.]

A survey of the conditions prevailing for the chemical trade throughout the European markets, undertaken twelve months ago, by official observers, showed that on the whole a turn for the better in trade relationships was becoming apparent. Overseas trade was just moving out of the extreme hopelessness associated with the world-wide depression, and a general feeling of confidence was being recovered.

To-day the possibilities in several directions are evolving into concrete realities and export trade totals are rising. The full statistics for European purchases during the twelve months of 1924 are not yet available, but more settled political conditions have been reflected in the elimination of many import restrictions and undue currency fluctuations, so that there is reason to believe that sound progress is being maintained. Throughout the year 1923, the results of our trade with European countries were most encouraging when compared with those of the previous year, both from the point of view of the aggregate sales amounting in all to over £4,500,000, and also from the development of business in at least eleven of the leading countries. As the diagram reveals, by far our largest demands came from France, followed in order by Spain and the Netherlands, whilst useful totals of chemicals were taken by Scandinavian countries. In some instances the business effected was even better than the normal trade done by British manufacturers before the war, but this, unfortunately, is discounted by the underconsumption still reported from Central European buyers, of which the outstanding markets are in Russia.



Spanish Market for Chemicals

Competition is being reported in several respects from German exporters, and their activities in such a country as Spain, sometimes contrast most unfavourably with our general ignorance of conditions. For instance, a British traveller's report on Spain, written early in January, showed that the writer was surprised to find no revolution there. Local commercial officers complain that many visiting merchants expect to find the country in an unsettled condition, whereas the markets are more satisfactory then they have been for years. When it is remembered that Spain is buying nearly £1,000,000 of chemicals per annum from us, it is obvious that not all British exporters are deluded as to the business possibilities. Spain is buying in several classes of products, and is quite the best customer we have for some manufactures. In citric acid, for example, over 1,000 cwt. were purchased during 1923, or almost as much as the rest of Europe combined. It held also the predominant position with demands for sulphate of ammonia (approaching 56,000 tons), and was second best for British supplies of ammonium chloride and also borax. The prospects of strengthening trade in this direction appear to lie with sulphate of copper and heavy oils, both of which are entering the market from competing sources.

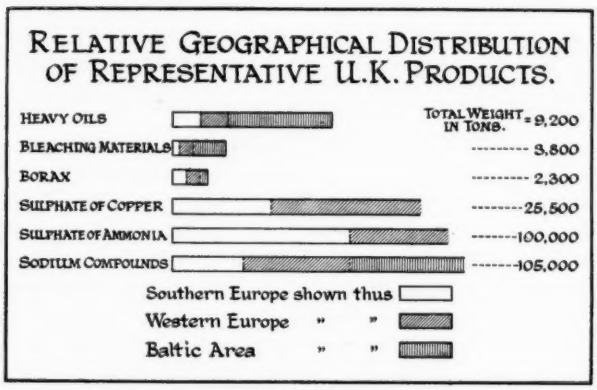
In other Southern European countries these two products do much better, and both in Portugal and Italy the business is noteworthy. For the former the totals for sulphate of copper are 2,700 tons and with the latter 3,700 tons, whilst the Portuguese purchases of heavy oils, to the extent of over 25,000 cwt., exceeds that of all the countries shown in the Western European section of the diagram. Both Portugal and Italy are countries with large potentialities, which will repay closer attention. At present they are being hindered by lack of capital. Our borax supplies to each of these is worth more than our sales in French markets, and many acids are also doing well.

Italy's Needs

Italy consumes British chemicals to a considerable extent both for industry and agriculture, and among the chief imports are caustic soda, bicarbonate of soda, and glycerin. Attempts at local manufacture of the latter are being carried out, whilst other competition comes chiefly from American sources. Local soap production uses extensively bone grease from the United Kingdom, whilst British paints and colours of the best quality are in demand by motor-body builders. Ammonium and sodium compounds are not so largely bought

from us as from competitors, but a fair movement was discernable during the last recorded period.

In the Western European countries we are, of course, more soundly established, and British chemicals of almost every description find favour in Holland, Belgium, and France. Of these, the first-named absorbs largest quantities of salicylic and citric acids, crude glycerin, and red lead, whilst Belgium leads in respect of acetone—distilled glycerin—and insecticides. The greatest demand comes from France, both by reason of its scattered textile industry and also because of its fertiliser requirements in agricultural areas. Commercial stability is much more certain than it has been, and British trade officers in reporting upon the growing signs of prosperity, stress the chances for our chemical productions. The proximity of the market favours our export trade, and certainly in several cases we supply not only the bulk of demands, but these represent our best trade totals upon the Continent. This is so with nitrate of ammonia, in which our sales during the last recorded year to the whole of Europe ranged round 5,000 tons, and of which quite 80 per cent. went to France. Again,


RELATIVE GEOGRAPHICAL DISTRIBUTION OF REPRESENTATIVE U.K. PRODUCTS.
TOTAL WEIGHT IN TONS.
HEAVY OILS = 9,200
BLEACHING MATERIALS ---------- 3,800
BORAX ---------- 2,300
SULPHATE OF COPPER ----------25,500
SULPHATE OF AMMONIA ----------100,000
SODIUM COMPOUNDS ----------105,000
Southern Europe shown thus
Western Europe " "
Baltic Area " "

this country took much more than half our continental sales of ammonium chloride and easily the largest proportion of iodides. Other items of sound business are apparent in the statistics of potassium chromate, where the amount taken was nearly 6,000 cwt., and in the 1,600 tons of magnesium compounds. For the agricultural interests quite useful quantities of fertilising and plant chemicals are taken and this business is expanding. Ammonium sulphate, for instance, was supplied by the United Kingdom to the extent of 31,000 tons during 1924, as compared with 27,500 tons during the preceding twelve months, although the greater possibilities are shown by the 1922 figure of 40,000 tons. Copper sulphate is in request from the vine districts, and at present France is by far the outstanding purchaser in this respect.

Developing Trade in Scandinavia

The European area in which British manufacturers have made the most successful headway during post-war years is probably that of Scandinavia. These countries were little disturbed by war conditions and benefited by their position to an extraordinary degree, which, among other ways, has reflected itself in increased chemical purchases from Great Britain. Norway, Sweden, and Denmark all take a very considerable volume of such products as bleaching materials, heavy oils, distilled glycerin, and various sodium compounds. It has to be noted that our increased share of these markets may be partly attributed to the decline in promptness and certainty of supplies previously maintained by German competitors, and that our new position will, therefore, require to be carefully watched. The most valuable of these countries for chemical purchases is Sweden, but during the year 1923 the Norwegian demands from the United Kingdom were higher. These latter were made up of 800 tons of chloride of lime, practically all our continental exports of oxide of aluminium, totalling 7,300 tons, and the greater percentage of aluminium sulphate, weighing 3,700 tons. The Swedish trade included 16,000 cwt. of red lead, 39,000 tons of sodium compounds, 500 tons of borax, and for the pulp and iron trades a greater quantity of chloride of lime than any other country. Whilst Norway and Sweden are actively engaged in industrial output the Danish requirements are mainly agricultural, and in this connection much of the chemical supplies are maintained from German factories. It is of importance, however, to see that in heavy oils and glycerin as much business comes to British firms as is derived from Norwegian demands.

Summing up the situation briefly, it appears that the Baltic group of countries together with Southern European group have not yet been brought to the business condition of the few countries in the section of Western Europe, although when related to pre-war trade there is ground for much confidence.

Foamite and Oil Fires

Results of Ten Years of Experience

THE foam method of extinguishing fires in oils and other highly inflammable liquids and substances is a pioneer development of Foamite Firefoam, Ltd. Foamite Firefoam was introduced in 1914, and almost immediately won the recognition of the large oil companies owing to its very tough and fire-resisting properties and also on account of its ability to withstand exceedingly rough usage.

Looking back over the last ten years, Foamite Firefoam appears to have fully justified the hopes entertained, and to-day there are numerous records of fires of formidable dimensions being completely subdued as soon as it was applied. On land and sea, in this country and abroad, in fact wherever there are highly hazardous risks, there Foamite apparatus has been proved to be one of the surest safeguards against disasters of this particular nature. No fewer than 25,000 large oil tanks and 200 large oil-burning or oil-driven liners are now protected with the Foamite system. The London Fire Brigade, too, have adopted it to deal with oil fires, having purchased a 600-gallon equipment mounted on a 50 h.p. chassis.

The early experiments in connection with this system of fire protection were conducted in the firm's well-equipped laboratory under the supervision of three of their expert chemists, while the later practical developments were made

THIS FIRE WAS EXTINGUISHED IN 1½ MINS. WITH FOAMITE FIREFOAM

possible by their staff of engineers who designed the method of distributing the foam. Only by observations taken under actual fire conditions was the present efficiency reached.

The whole secret of this success lies in the foaming ingredient, Firefoam liquid, for which the firm claim there is no known adequate substitute. A foam, of course, may be made with the aid of other chemicals and may be effective upon miniature fires under favourable conditions, although possibly quite inadequate in the case of larger outbreaks. Especially in the case of systems requiring the storage of large quantities of solutions an important economic question also arises, viz., have the solutions to be renewed at frequent intervals? A definite negative answer is given in the case of Foamite Firefoam installations, for in no instance has it been found that the solutions have deteriorated in the slightest degree over a reasonable period of years.

Exactly the same foam which has been the means of extinguishing huge conflagrations upon oil tanks of eighty feet diameter and over is produced by the mobile appliances which range from a one-gallon extinguisher to engines of 600-gallons capacity. These have been installed in works and factories all over the world, and it would be extremely difficult to estimate the value of the property which has been saved by the use of Foamite apparatus.

Crushing and Grinding in Chemical Industry

Chemical Engineering Group Conference

At a meeting of the Chemical Engineering Group at Burlington House, London, yesterday (Friday), papers were presented by C. S. Messinger, B.A., on "The Raymond System of Grinding and Air Separation"; R. J. Glinn, M.I.Mech.E., on "Notes on Coal Crushing and Grinding Machinery"; W. T. W. Miller on "Crushers used in the Chemical Industry"; and C. J. Seaman, M.I.Mech.E., on "Grinding Mills, with special reference to Rollers." The papers, which are summarised below, were discussed at some length.

The Raymond System of Grinding and Air Separation

Mr. Messinger, in his paper, stated that before the Raymond system was introduced, nearly fifty years ago, the existing methods of grinding and separating were very crude. It was usual to grind by means of burr stones, and the finished product generally contained a considerable percentage of large over-size particles. The burr stones were followed by tube mills and various kinds of roller and beater mills, all of which had the same failing, in that the finished product was not uniformly ground. When the demand for a uniform fine finished product arose, the manufacturers of grinding machinery introduced various devices to attach to their grinding machines in order to produce this result.

The Raymond Brothers, however, commenced by developing a device which would separate the coarse over-sized particles from a previously ground aggregate and produce a uniformly fine finished product. After this problem had been solved they experimented to find the most suitable type of pulveriser to attach to this device—the Raymond Air Separator. This principle of uniform fineness without oversize rather than a large tonnage of uncertain fineness had always been the primary object. As a result powders of any uniform fineness to 350 mesh and even better, could be produced with a minimum expenditure of power.

The application of air for separating the fine particles from the coarse was based on the following fact. If a rotary motion was imparted to a volume of dust-laden air the material would be acted upon by centrifugal force, as in the dust collector. As a result of the cyclonic action thus set up most of the material was thrown to the periphery and discharged through the tailing spout. The air, carrying with it some extremely fine dust, escaped through a vent pipe in the top of the collector.

If a means of collecting this vent dust and of regulating the centrifugal force in the collector was provided a true "air separator" resulted. The first condition might be accomplished by running the vent pipe into an exhauster and installing a second collector of suitable design to recover the dust passed by the separators. The aggregate was drawn into the first collector, where the coarse was separated and discharged, and the fines blown into the second collector.

There were two applications of the air separator. In one the separator was an integral part of the grinding unit, or rather the pulveriser was a part of the separator. In the other the separator was used in conjunction with and supplemented those types of grinders which did not have air separation as an integral part. In the second the separator is used to replace batch grinding or screens for an extremely fine product. The economies arising from not having to deal with tailings was self-evident. There were certain cases where it was not advisable to use a combined unit. For example, it was more economical, on account of their abrasive character, to reduce quartz and other siliceous materials in a tube mill, and afterwards treat the product in an air separator to remove any oversize.

Applications of Grinding and Pulverising with Air Separation

Grinding and pulverising with air separation was particularly applicable when an extremely fine uniform product was required, with a raw material which was of a damp or sticky nature, or where absolute dustless operation was required. The degree of fineness which it was possible to obtain is extremely high. Such materials as barytes, litharge, talc, blanc fixe, calcite, graphite, etc., were being reduced to 350 mesh and even finer by the Raymond system.

In this connection the term "fineness" was used very loosely. For instance, some would say that they required a 200-mesh product. They really did not mean a product which would all pass a 200-mesh sieve, but only a certain percentage. This percentage might be high, such as 98 per cent. or 99 per cent., but even at this percentage there was an enormous difference between this and 100 per cent. fineness. It was important to specify the exact fineness required. The largest permissible size of the remaining percentage which might be retained on the screen should also be specified.

The uniform grinding produced by the Raymond system often enables great economies to be effected, especially when the ground material had to undergo some further chemical process, such as phosphate rock, which was mixed with sulphuric acid to produce soluble phosphate, bauxite to produce alum, or pulverised coal mixed with air to produce a combustible mixture. In the case of the manufacture of acid phosphate the analysis of the rock, such as the amount of tricalcium phosphate, iron and alumina oxides, etc., was known, so that the amount of acid and its strength could be calculated for the guidance of the mixer. The finer the rock ground, the less was the amount, and the weaker was the strength of the acid required, but for every grind and analysis a certain amount and strength would give the best results. If the uniformity of the grind varied, the mixer would be lost. He would obtain a product which was in poor mechanical condition, sticky or lumpy, sometimes necessitating the addition of more rock, sometimes more acid, sometimes even remilling, thus wasting time and labour in addition to producing a poor product. When his rock came uniformly ground he could work to the calculated formula, knowing that he would obtain an acid phosphate which would be in a good mechanical condition, containing a maximum amount of available phosphates and a minimum of insoluble. In like manner when pulverised coal was used as a fuel, uniformity and fineness were of great importance. Pulverisers equipped with air separation were particularly suitable for the reduction of materials of a sticky nature and various resinous products such as gums, rosins, pitch, etc. The less such materials were handled the better. In Raymond Pulverisers, as soon as the material reached the requisite fineness it was removed by the air stream. There were no screens or bars to clog and choke.

Some materials would grind better when they were hot; others when they were cold. Take certain kaolins, for example: under certain conditions their moisture content was high, and they would soon sweat and stick in any type of grinder, especially where a fine product was required. It had been found that if the air was heated this sticky tendency was minimised and the clay pulverised quite easily. To heat the air a steam coil or some other heating device was placed in the return air pipe.

As any pulveriser generates heat in grinding, some materials such as certain dyes were very difficult to reduce, especially in hot weather. The heat softened the material, which became rubbery, and instead of fracturing and powdering tended to amalgamate. In a particular case which was brought to the author's notice, a coil in which cold water was circulated was placed in the return air pipe, so that the temperature was reduced to about 30° C. At this point the dye did not soften and could be ground into an impalpable powder.

The Raymond system could also be used for the grinding of materials of a combustible or explosive nature. In such cases the air was charged with carbon dioxide or some other gas which did not support combustion. The gas could be introduced from tanks or any other available source. Good results had been obtained by burning coke in a small stove and introducing the product of combustion into the air systems. Sulphur, certain pigments, colours and dyes had been successfully treated in this manner.

Where the material to be ground was of a poisonous nature, or where dust must be eliminated because of the location of the pulveriser, air separation was the only system that could be effectively used. Raymond units when properly erected and operated were absolutely dustless. This was a great advantage when dealing with calcium or lead arsenates, lead products, insecticides, etc. Not only was the health of the employees safeguarded, but the expensive installation and operative costs of a dust-collecting system were eliminated.

Another important application of air separation was the cleaning of a product from impurities. This was of great importance in the treatment of hydrated lime, clays, litharge, ochres, phosphate rock and many other minerals. To illustrate the principles involved, assume that they wished to remove the impurities from hydrated lime. This material as it came from the hydrator usually contained impurities such as over- and under-burnt lime, clinker, silica, etc., which were generally covered with a coating of good hydrate. These impurities should be removed if the hydrate was to be used for chemical purposes to prevent contamination. If it was to be used for plastering they should be removed so that a smooth " putty " could be obtained, and to prevent " popping " on the wall or bursting of the bags, which would occur if any over-burnt lime was present, because in time these particles would take water of hydration and swell. When this mixture entered the pulveriser the fine pure hydrate was at once drawn into the separator and the remainder dropped to the beaters. The beaters threw it against the sides and knocked the good hydrate free from the impurities and reduced it to a fine powder. The impurities, because they were harder, were not reduced, and being larger were projected to the periphery by centrifugal force. They thus had a whirling mass of material, the outer ring of which was composed of the impurities.

Clays sometimes contained a percentage of silica which was detrimental even when ground to an extremely fine powder. Such clays could not be used as a filler for paper because the silica would cause discolouration, nor as a filler for rubber because it would produce tiny pinholes. A Raymond pulveriser equipped with the core extractor enabled owners of inferior deposits to produce a pure product with no extra expense because the silica could be eliminated during the grinding operation. In calcining various minerals to produce oxides it was nearly impossible to obtain complete oxidation. A certain percentage would invariably remain in the original metallic state. Litharge generally contained a percentage of blue or metallic lead which was extremely detrimental when the litharge was used for the manufacture of rubber, batteries, etc. The impurities in these and similar cases could be removed by the core extractors.

Another application of air separation was the production of a granular material with a minimum of fines. The equipment is adjusted to do as little fine grinding as possible. The granular product is removed by the inner cone conveyor while the fines are discharged through the cyclone. This application is used by grinders of sugar, mono-calcium phosphate, glass, emery, etc. Another small refinement made possible by the use of air was an automatic feed-control.

To summarise, the Raymond system of grinding and separating was particularly applicable where an extremely fine powder was required, where a uniform product was desired, where the material was sticky or damp, where heat caused softening of the material, where a poisonous material must be ground, where impurities should be eliminated, where a concentration of some mineral was wanted, and where dustless operation, always desirable, was aimed at.

Crushers Used in Chemical Industry

The chemical industry, Mr. Miller stated, covered so wide a field that practically every known form of crusher was brought into service, either in the preparation of the raw materials or in the subsequent reduction of the finished products. It was not generally realised that the demand for crushed limestone for the alkali trade was of so great a magnitude that some of the largest crushing plants in this country and in America were devoted to the preparation of this material only. The crushing of pyrites ore prior to the extraction of the sulphur, the breaking-down of caliche preparatory to leaching out the nitrate of soda, and the reduction of many prepared chemical substances, all required crushing machinery in some form or other.

Blake Type Jaw-Crushers

Among the many types of crushing machines, it was probable that the jaw-crusher was the one most commonly used in this country, and, whilst in these machines the moving jaw was actuated by various arrangements of mechanism, the original double-toggle system, patented in 1858, still remained most generally satisfactory as supplied to heavy crushing machines. In any jaw-crusher, the shape of the teeth and the profile of the jaws had a very important bearing on the crushing. It frequently happened that if the teeth were too sharp they would bite into the material, thereby preventing it from falling freely during the draw-back stroke, so that the flow through the jaws was impeded, the output being consequently reduced. Sometimes, as for instance when crushing alum, the teeth were serrated to assist in gripping the material. Blake-type crushers (illustrated in the paper) were made in a great many different patterns and sizes, ranging from a feed-opening 8 in. by 6 in. to the mammoth crushers with opening measuring 7 ft. by 5 ft. 6 in. This particular machine weighed 90 tons, it took 150 to 200 b.h.p. to drive, and was capable of crushing about 150 tons per hour to 6 or 8 in. pieces, accepting blocks fed by steam shovel up to 1½ ton in weight.

Single-Toggle Crushers

There was another form of jaw-breaker that had proved very useful for certain classes of work, viz., the single-toggle crusher. In this machine the swing-jaw stock was pivoted on the revolving eccentric shaft, which imparted a vertical as well as a reciprocating movement to the jaw. The crushing movement was a peculiar one, the elliptical travel at any point of the jaw being modified by the radial action of the single toggle-plate, with the result that the upper part of the jaw advanced whilst the lower part receded. The crushing was, therefore, more nearly continuous than in the Blake type breaker. In this machine, the crushing stroke was greater at the top of the jaws than it was at the bottom, whereas, in the double-toggle crushers, the movement was reversed, the greatest travel taking place at the bottom of the jaws. This extra movement at the top of the jaw was of value when crushing soft or elastic material, as it required some penetration before it would rupture, but there was the disadvantage that the pressure from the crushings of the large

TABLE SHOWING DETAILS OF OPERATION WITH SPECIFIED SUBSTANCES OF RAYMOND MILLS.

Material	Mill	Capacity Tons/hr.	Fineness	Upkeep per ton d.	Grease per ton d.	Labour per ton d.	Total per ton d.	H.P. required
Limestone	5 RLS	5 t. p. hr.	95% 100 M.	0·75	0·50	2·125	3·375	90
Coal	5 RLS	5 t. p. hr.	95% 100 M.	0·75	0·50	2·125	3·375	90
Barytes	5 RHS	25-30 cwt. p. hr	99·9% 300 M.	0·5	0·650	8·5	9·65	80
Barytes	5 RHS	42-45 cwt. p. hr.	99·5% 240 M.	0·5	0·650	5·10	6·25	80
Gypsum	5 RLS	8-10 t. p. hr	98% 100 M.	0·5	0·650	1·28	2·38	85
Iron oxides	5 RHS	20-25 cwt. p. hr.	99·5% 280 M.	1·0	1·00	9·00	11·00	95
Phosphate rock—								
Gafsa	5 RLS	6-8 t. p. hr.	95% 100 M.	0·5	0·5	1·6	2·1	95
Tennessee	5 RLS	5-6 t. p. hr.	95% 100 M.	0·75	0·5	2·125	3·375	95
Florida pebble	5 RLS	3-5-4 t. p. hr.	95% 100 M.	1·00	0·5	3·2	4·7	95
Umber	5 RHS	20 cwt.	98% 300 M.	0·40	0·75	12·8	13·95	95
Talc	5 RHS	30-35 cwt.	99% 300 M.	0·30	0·75	1·3	8·35	90
Talc	5 RHS	30-40 cwt.	99% 200 M.	0·30	0·75	6·4	7·45	90

pieces reacted directly on the bearings for the eccentric shaft. Single-toggle breakers were, therefore, rarely made in big sizes, 24 in. by 13 in. being about the largest standard. With the single-toggle mechanism, it was essential that the eccentric shaft should revolve downwards towards the feed mouth, in order to drag the material downwards during the process of crushing. Jaw type granulators would make a reduction of about 6 to 1, reducing to as fine as ½ in. ring size in the 10 in. by 3 in., or approximately ¾ in. cubes in the 20 in. by 6 in. Generally speaking, it was not advisable to reduce more than 6 to 1 in any jaw crusher; that was to say, if the bulk of the stone was 18 in. thick, the crusher should not be set for a product finer than 3 in.

Gyratory Crushers

Gyratory crushers were not so common in this country as they were in the United States, but there was a fair number in use, and they possessed advantages over jaw crushers for certain kinds of work. The outstanding feature of the gyratory, as compared with the jaw crusher, lay in the fact that when the cone was receding from one side of the machine it was crushing on the opposite side of the basin, consequently crushing was taking place all the time, whereas, in the jaw crusher, no breaking was done on the draw-back stroke. Gyratory crushers, especially the bigger sizes, would give very large outputs, much more than could be obtained from a single jaw-crusher. Again, owing to the continuous crushing action, output per h.p. was higher in the gyratory than in the jaw crusher.

The advantages of the Blake crusher were:—Intermittent crushing. Output per h.p. moderate. Size of product readily adjustable. Bearings fairly easy of access. Normal wear on bearings increases motion. Jaws and cheeks easy to renew. Headroom not excessive.

Points about the gyratory crusher were:—Continuous crushing. Output per h.p. relatively high. Product not adjustable without new parts. Bearings not easy to reach. Wear on bearings reduces crushing stroke. Concaves and mantle not easy to replace. Headroom considerable.

Rolls

Crushing rolls had been used for many years as secondary breakers, and were made in a number of types to suit the particular duty they were called upon to perform. All rolls were primarily belt driven, but the true belt-driven mills had independent belt-pulleys on both rolls and work without the intervention of gearing. Rolls of this type were not suitable for running at slow or moderate speeds, as they were liable to "choke" unless the revolutions were sufficiently high to gain full effect from the flywheel pulleys and high belt speeds. These belt-driven rolls were generally fitted with plain shells, their chief use being for finer crushing than the geared rolls. They became more effective the greater their diameter, as, not only did the large rolls grip the material better and take larger pieces than was possible in the smaller mills, but the mass of the roll revolving at high speed formed a reservoir of kinetic energy which was particularly useful in flattening the power curve. Broadly speaking, it was not advisable to attempt to reduce more than three or four to one in a single pair of rolls. This rule applied more particularly to rolls fitted with plain shells, giving smooth surfaces. All calculations as to output from rolls were based on the "ribbon" theory. Given rolls of sufficient diameter to crush the material without hesitation, and a regular and even feed across the full width of the rolls, about 20 to 25 per cent. of the solid ribbon was the maximum obtainable in practice on any hard material. A mechanical feeder to spread the material over the face of the rolls would be found of great service in reaching the maximum possible output from rolls. When toothed shells were fitted, the gripping power of the rolls was artificially raised, but with smooth shells the difference between feed and finished size, multiplied by 27, was a fair rule for the diameter of the rolls for satisfactory working. The surface speed might vary from 300 to 1,300 feet per minute or be even higher in exceptional cases. Irregular wear of the roll-shells was a frequent source of trouble when rolls were used for the fine crushing of any hard material. If the two rolls were not kept exactly in line, flanges were formed on the overlapping edges, these flanges naturally preventing the rolls from being adjusted close together. Unevenness of flow caused the shells to wear hollow in the centre, with the result that a large amount of over-size material passed the rolls. If the feed size was greater than should be fed to the rolls, the large pieces abraded the surfaces before they were rubbed down to a size at which they could be nipped, and corrugations were formed which quickly enlarged, causing the mill to give a very irregular product.

Disc Crushers

The horizontal disc crushers had proved particularly useful for certain kinds of work, possessing outstanding advantages over rolls within their working limits. Crushing took place between two saucer-shaped discs, which were separately attached to inner and outer shafts. The material to be crushed was introduced by a feed-spout through the hole in the outer disc. Although the two pulleys were driven at different speeds in opposite directions, the discs rotated together in the same direction, at the same speed, and the material was spread outwards over the whole area of the discs by the action of centrifugal force. It was necessary to emphasise the fact that the discs rotated in unison, because, at first sight, the machine would appear to be a grinder with the discs rotating in opposite directions. In point of fact, the friction of the semi-spherical bearing was sufficient to cause the inner shaft with its disc to revolve in the same direction as the hollow shaft and outer disc, and the presence of material between the disc-faces makes the action more positive. The eccentric pulley was rotated in the opposite direction to increase the number of crushing strokes.

The "wear and tear" on the faces was very small and the discs remained uniformly smooth throughout the whole of their life. As there was no tendency to irregular wear or corrugations, the quality of the product was maintained, and, in fact, improved rather than deteriorated. In this respect the disc-crusher showed to great advantage over rolls. The shape of the discs, combined with the centrifugal action, ensured free crushing without packing, thereby reducing the power consumption, and minimising the production of dust by eliminating the attrition of the particles in their struggle to pass a restricted outlet-opening.

Wearing Parts for Crushers

During the last twenty years or more great advances had been made in the designs for crushing machines, also in the materials from which the parts were made. The renewal of the crushing faces formed so large a part of the cost of operation that any addition to their life was a real benefit to industry. Among the alloy-steels used for the purpose, manganese steel had been found to possess wonderful properties for resisting abrasion, even whilst it combined remarkable toughness to withstand the shocks involved. In some instances manganese steel could not be used owing to the desire for a material that could be machined, and in such cases the chrome-steel alloys had proved useful. They were particularly responsive to heat treatment, making it practicable to furnish them in different degrees of hardness and ductility to meet the varying conditions of service.

Coal Crushing and Grinding Machinery

THE fineness to which coal was pulverised (Mr. Glinn stated) was always expressed in terms of the percentage of powder which would pass through a sieve having a certain number of meshes or openings per lineal inch. The fineness would vary in accordance with the requirements. For steam boiler furnaces the coal should be pulverised to a fineness of at least 70 per cent., passing a 200-mesh sieve when high volatile coal was used, and to a fineness of at least 85 per cent. passing a 200-mesh sieve when low volatile coal was used. In furnaces where combustion took place in the presence of the material being heat treated, such as cement, care must be taken to pulverise the coal to the degree of fineness demanded by the operation, and in numerous cases it was necessary to pulverise the coal to a fineness of at least 88 per cent. passing a 200-mesh sieve. In England and countries where the English system of measurements were in use, the 200-mesh sieve was generally accepted as the standard when referring to fineness of pulverised coal. On the Continent the fineness was expressed in terms of the percentage passing through a sieve of 4,900 meshes per sq. cm. This was equivalent to about 180 meshes per lineal inch.

The processes employed and the necessary machinery required for pulverising depended on certain qualities of the coal. For example—if the coal contained a certain amount of moisture, it was not economical to grind this right away without getting rid of the surface moisture, as otherwise a high power would be required for grinding. Also certain factors in the combustion of the fuel necessitated the employment of some means of getting rid of the moisture before it was pulverised. The usual form of apparatus was a rotary drier, and such driers had been in use for a considerable number of years. Before the coal could be ground it was necessary to extract any hard metallic matter, generally termed "Tramp iron," and a standard type of magnetic separator was employed for this purpose. The grinding mills commonly used at the present time could be classified into two distinct types: "A," high-speed impact mills; "B," slow-speed grinding mills. The first was the kind which was more frequently met with in France and Belgium, and was used in this country in some cases. It was only suitable for dealing with relatively small quantities of fuel, both in view of the difficulty of designing large units which could be maintained at a reasonably low cost, and also due to the driving power required being somewhat high. This type of machine was not recommended for large outputs.

The other kind of pulverising mill was a slow-speed machine of which there was a number of well-known types. The kind which was more used than any other type was the Ball mill of the Fuller type, which had been developed in America, but was now being manufactured in this country. In this case the machine was a slow-speed machine, which ran at a speed of about 140–200 r.p.m. The machines were made in standard sizes, from about one ton capacity, and the largest size was capable of dealing with about twenty-five tons of coal per hour. There are two forms of Ball mill, one termed the "air separator" type, and the other the "screen" type, differing in the design according to the class of material it was required to pulverise. If it was a relatively soft material, then the machine by which the fuel was separated by air externally in a cyclone was used.

Grinding Mills, with Special Reference to Rollers

The oldest type of mill was the Flat Stone mill, which had been in use with very little modification from time immemorial; it still had the advantages, first, that every particle had to pass over a large surface between the upper and the lower stones, and therefore the whole of the material so passing was ground to a considerable degree of fineness. The main improvements had been first the substitution of the lower stone for the upper one as the revolving unit. Secondly, the use of French burr for granite or sandstone. The Americans in later years had largely boomed artificial stones, but British experience had shown that these stones rapidly lost their cutting edges, and required redressing some ten to twenty times as often as did the French burr.

The Edge Runner mill was a glorification of the old well-known mortar mill in use by builders. When the output required justified it, it was quite an efficient method of crushing larger particles, say, up to 2 in. cubes, into a comparatively fine powder, but, as it was not certain that every particle was brought an equal number of times under the runners in their passages round the mill, it was necessary to separate the product into that which was sufficiently fine and that which had to be returned to the mill for further grinding. The Disintegrator type of mill was exceedingly efficient when new, but it suffered considerably from wear and tear.

The Ball and Tube mills were useful when the material to be ground required a series of comparatively light blows to abrade it, but its result was somewhat uncertain, and needed to be sieved to separate those particles that had not been sufficiently reduced—they were often made with linings of granite and porcelain.

The Roller mill had many forms, and its history was somewhat uncertain.

Apart from use in the soap and chocolate trades, the five or more roller mill had practically gone out of use. The triple roller mill proper for a long time continued without any advance, the first important improvement being the development of the upright model, which consisted of two rollers of equal diameter superimposed over one roll of a larger diameter. The next great improvement was the introduction of the "Quadrant" mill, which provided for easy adjustment of the gear wheels to compensate for the wearing of the rolls. This was accomplished by the introduction of two extra gear wheels carried on quadrant arms, which could be adjusted as and when required. The most modern type of Roller mill was illustrated by the "Helix" patent triple roller mill, which gave an output varying from 20 to 100 and 150 per cent. more than other mills of equal roller lengths. In addition to this increased output, the grinding was so much finer that it was quite a common occurrence where materials were ordinarily put through the mill a number of times for the number of such traverses to be reduced by 40 or 50 per cent. The principal point of interest was the "Helix" gear. It was this form of gearing that more than any other detail had helped in securing the wonderfully perfect grinding powers of the "Helix" mill.

Industrial Uses of Hydrated Lime

Two admirably-prepared pamphlets—one dealing with the use of hydrated lime ("Limbux") in water-softening, the other showing its many advantages in varnish manufacture—reach us from the Buxton Lime Firms Co., Ltd., Buxton. They are prepared with full technical knowledge of the industries referred to, and the part which hydrated lime plays is described in clear terms, which the commercial man as well as the chemist can easily follow.

Water-softening

In regard to water-softening, the most widely-adopted method is the lime-soda ash process. This gives very satisfactory results, provided that the lime and soda ash re-agents used are of high quality, and are added in proportions based on a knowledge of the composition of the water. When the process was first applied in industry it was customary to use lime in the form of "lime-water," but the lime-water plants have gradually given way as the advantages of the "milk-of-lime" plants came to be recognised. Although satisfactory results can be obtained by the use of quicklime, very careful attention must be paid to the design of the plant used and to the control of the preparation and addition of the re-agent. The difficulties involved in the use of quicklime can be overcome to a great extent if the lime is added in the form of hydrated lime, and the Buxton company have made a point of producing a lime which in its fine division and freedom from gritty matter meets the requisite conditions. Among many advantages, the risk of fire during storage is entirely eliminated. In recent years a number of softening plants have been put on the market in which a solid mixture of lime and soda ash is added to the water without the preliminary preparation of a re-agent liquor. Hydrated lime is a form of lime which is particularly suitable for use in plants of this type. It can be readily mixed with soda ash to give a finely divided uniform mixture the addition of which to the water can be easily controlled by the apportioning gear.

Purification of Drying Oils

Of late years the main development of the varnish industry has resulted from the purification and hardening of resin and the purification of drying oils, such as linseed and china wood oil (Tung oil). The raw resins contain a certain proportion of acids, and these are, of course, deleterious to the varnish after preparation, if they are allowed to remain during the process of manufacture. In order to neutralise these acids and remove them from the product an alkali is added, and no better one can be desired than calcium hydrate or hydrated lime, a fine white powder and a strong, though harmless, alkali. The defects, if the resin is not purified, are serious; whereas the use of hydrated lime counteracts the disadvantages, and in addition clarifies the resin after neutralisation of the harmful acid in the raw material, and hardens the varnish, increasing its wearing properties and ease of application considerably. Equally satisfactory results are obtained from the use of hydrated lime in the purification of drying oils. The various processes of purification and the part which hydrated lime plays in them are described briefly, but thoroughly, in the course of the pamphlet, together with information as to the Buxton firm's product—analysis, package, delivery, etc.

The Development of the Hardinge Mill

By J. C. Farrant, M.A.I.M.E.

Further notes are published below of developments and improvements in design of the Hardinge Mill, with particulars of operating data.

The data so far submitted have dealt with mills installed in the United States and Canada, but in order to meet the demand for the Eastern Hemisphere it was arranged to manufacture in England in 1912, and a London office was opened in December of that year, the writer returning here to take charge of operations on this side.

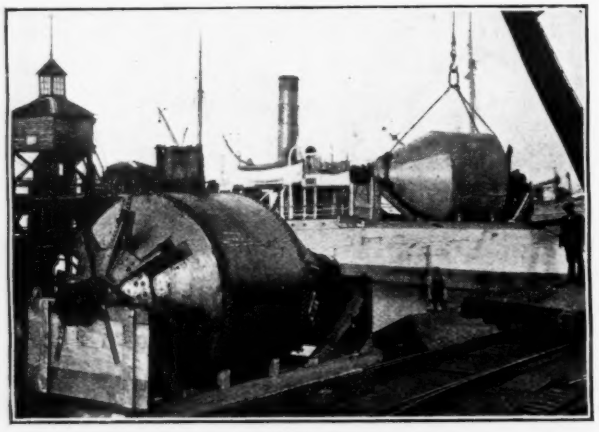


FIG. 1

In 1913 and 1914 nearly 100 British-built mills were shipped to various parts of the Eastern Hemisphere and South America, including South and West Africa, Rhodesia, India, Dutch East Indies, Australia, Korea and many European countries. Fig. 1 shows two 6 ft. mills being loaded on board ship at Erith, Kent, for Russia. Some 30 mills were despatched during this period to that country for grinding copper, lead and zinc ores. The following screen analyses of Atbasar plant, Russia, refer to an 8 ft. diam. by 22 in. cyl. Pebble Mill using run of mine as grinding media, the material being copper ore :—

	Original Feed.	Product from Classifier.
¼ in.	2·9 per cent.	— per cent.
⅛ in.	62·1	—
20 mesh	23·6	—
60 ,,	6·5	3·7
60 ,,	4·9	—
80 ,,	—	15·5
120 ,,	—	13·7
200 ,,	—	14·9
200 ,,	—	52·2
Capacity	60 tons per day.	
H.P.	40	

Grinding Media—Coarse pieces of broken ore as location of mine made importation of pebbles too costly.

The following figures relate to plant at Ridderski, Siberia :—

Material : Copper ore, quartz gangue ; mill used : 6 ft. by 22 in. Hardinge Pebble Mill.

	Feed to Mill.	Product from Mill at 70 tons.	Product from Mill at 50 tons.
10 mesh	30·3 per cent.	— per cent.	— per cent.
20 ,,	16·2	0·6	—
40 ,,	34·0	18·2	0·92
60 ,,	8·5	14·9	5·04
80 ,,	5·0	11·3	5·79
120 ,,	3·0	12·0	12·49
200 ,,	1·7	11·7	18·97
200 ,,	1·3	41·3	56·79
Pebble charge	5,000 lbs., 2½ in. pebbles.		
R.P.M.	29		
H.P.	18		

SAME PLANT—4½ FT. BY 13 IN.—PEBBLE MILL RE-GRINDING TAILINGS.

	Feed.	Product.
20 mesh	4·8 per cent.	0·5 per cent.
40 ,,	12·3	2·5
60 ,,	11·9	5·7
80 ,,	16·4	13·8
120 ,,	20·2	26·9
200 ,,	26·5	30·3
200 ,,	7·9	20·3
Capacity	24 tons per day.	
Pebble charge	2,000 lbs., 2½ in. pebbles.	
R.P.M.	32	
H.P.	7	

N.B.—The pebbles should have been larger for this small mill.

VIEILLE MONTAGNE ZINC PLANT, CUMBERLAND.

Here was a particular problem to be solved. This company had a zinc lead ore in a siliceous limestone gangue. They required 30 mesh with a minimum of 200 mesh. Screen analysis is given below :—Material : Silecious limestone crushed to pass ½ in. ; mill used : 8 ft. by 22 in. Hardinge Pebble Mill.

Mesh.	Mill Feed. Weights.	Mill Product. Weights.
On 4	25·5 per cent.	— per cent.
6	30·0	—
8	34·0	—
10	7·5	—
20	3·0	5·0
40	—	18·0
60	—	17·9
80	—	15·4
100	—	4·4
200	—	25·8
Through 200	—	13·5
Capacity	4 tons per hour.	
Grinding media	6,000 lbs. flint pebbles.	
R.P.M.	27.	
Ratio of water to ore	3-1.	
Elevation of feed end	4 in.	
H.P.	35.	
Remarks	It is sometimes desirable to tilt the mill, as in this case.	

This product was obtained by raising feed end of mill 4 in. (the self-aligning bearings of this mill permit this to be done without any ill effect). By using large diameter pebbles—5 in. to 6 in.—and using 3-1 pulp dilution, the result was a very granular product, which gave highly satisfactory results

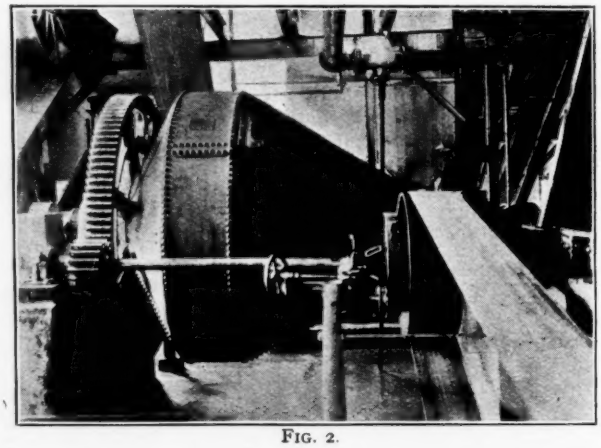


FIG. 2.

The manager of the plant given below, in a reference to the increased extraction consequent upon the Hardinge Mill product, wrote : "The new mill has enabled us to reduce the zinc in the fine refuse from 3·20 per cent. to 2·40 per cent.,

which means a net saving of ten tons of metallic zinc per month. At the last inspection the inside silex lining was found to be only very slightly worn and still in perfect condition." In this case the mill had paid for itself within two months from commencing operations.

Ball Milling.

The Hardinge Ball Mill followed the Harding Pebble Mill as a matter of course, but its application was not general until just before the war. The Ball Mill differs from the Pebble Mill in that forged steel or cast iron balls are used as grinding media in place of flint pebbles. The Ball Mill construction is heavier than that of the Pebble Mill, and the lining of the former is of metal, such as hard iron, manganese or chrome steel. Recently tests have been satisfactorily carried out by substituting rubber lining for steel for regrinding. This, however, is yet in the experimental stage.

It naturally followed that Ball Mills might reasonably take the place of stamps, taking the product direct from rock

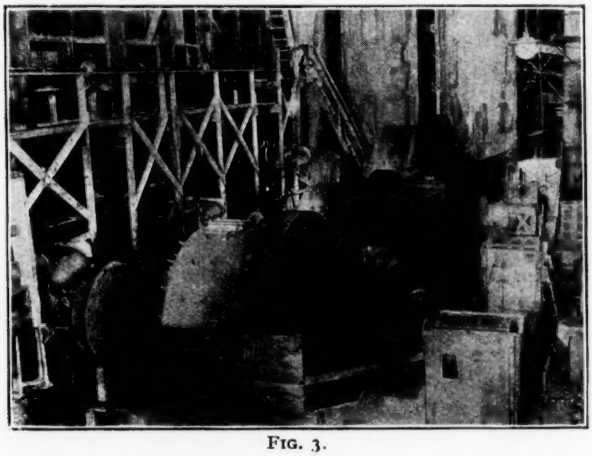


Fig. 3.

crushers, and several installations of 6 ft. dia. Hardinge Mills were made. It was considered at that time that the 6 ft. dia. mill was as large a unit as was convenient for a Ball Mill.

Contrary to usual practice, at least in so far as ore reduction is concerned, the first 8 ft. dia. Hardinge Ball Mill was manufactured under licence in Sweden for the reduction of iron ore in 1911. When the reports came through that this mill was handling approximately 30 tons an hour from 2 in. to 10 in. mesh, it caused considerable surprise.

It was not long, however, before the first 8 ft. Hardinge Ball Mill made its appearance in North America. Among the well-known mining companies to use these mills may be mentioned Dome Mines, Ltd., in Porcupine, where one of this size was guaranteed to produce 350 tons a day for a consumption of not more than 125 h.p. and a total steel consumption of under 1 lb., the range of grinding to be similar to that effected by the stamps. A screen analysis of the Hardinge Mill product and tonnage is given below, the material being quartz schist; mill used, 8 ft. by 30 in. Ball Mill.

Mesh.	Feed to Mill.	Product from Mill.
On 1¾	14·9 per cent.	— per cent.
,, 1½	13·81	—
,, 1	17·51	—
,, ½	24·61	—
,, 10	—	14·50
,, 20	—	14·17
,, 30	—	6·19
,, 40	24·15	5·78
,, 60	·50	6·44
,, 100	·36	5·27
,, 200	·41	2·48
Through 200	3·25	45·17
Capacity	496 tons in 24 hours.	
Ball charge	28,000 lbs.	
R.P.M.	24.	
H.P.	115, average.	
Water	46%.	
Consumption of Balls	0·7 lbs.	
Lining	Chrome steel.	

It should be noted that while the ball consumption was taken there was not time to ascertain definitely the wear of the lining. The average life, however, as determined later, was from 10-12 months. The results were so satisfactory that orders for additional Ball Mills were placed, and they have now three of this size running at the present time, capable of grinding approximately 1,500 tons per day.

Kirkland Lake District.

In this district, only a few miles distant, the ore is extremely hard and abrasive, and attention is drawn to the marked effect this hard ore has on the capacity of the same size of mill:—

Plant	Kirkland Lake Gold Mining Co.
Material	Quartz porphyry.
Mill	8 ft. by 30 in. Hardinge Ball Mill.
Feed	Average 15% on 1½ in.
Product	On 10 mesh .. 3·6 per cent.
	,, 20 ,, .. 11·4
	,, 28 ,, .. 6·8
	,, 35 ,, .. 11·1
	,, 48 ,, .. 10·1
	,, 65 ,, .. 12
	,, 100 ,, .. 11
	,, 150 ,, .. 6·7
	,, 200 ,, .. 6·3
	,, 200 ,, .. 21
Capacity	200 tons per day.
H.P.	120-125.
Motor	125.
Consumption of high carbon forged steel balls	2½ lbs. per ton.
Consumption of cast steel balls ranges as high as 4 lbs. per ton.	

The general adoption of Ball Mills for primary grinding in place of stamps marks another progressive step in ore reduction. The advantages of Ball Mills are:—(1) Less cost for installation; (2) Lower maintenance cost; (3) Greater output per unit of power consumed; (4) Higher percentage of possible operating time.

Steel consumption per ton is probably in favour of the stamps, and stamps can take a larger feed effectively than can Ball Mills, particularly on hard ore; but the advantages of the simplicity and flexibility of ball milling over stamps very greatly outweigh the minor disadvantages. In stating this, however, it must be remembered on the Rand the conditions are different and the remarks do not apply.

Ball milling has never been favourably accepted on the Rand since the failure of the "Gieseke" Mill in 1907. This was a German-made compound mill similar to the large compound mills used in cement plants. The output and fineness was all that was required, but when it came to checking up the steel consumption it was found to be over 5 lbs. per ton, and owing to the cost of imported steel balls, ball milling at that period was definitely turned down due to local conditions.

One reason of the high consumption was the hardness of banket ore, and this they have turned to good account, in that it makes an excellent grinding media when properly selected. Thus, they obtain their grinding media for no cost other than the cost of selection.

With the Hardinge Ball Mill opening up a new field, several makes of short cylinder ball mills made their appearance, both with and without grates, and whilst successes and failures have been reported on both sides when in competition, it can be generally stated that during the past five or ten years ball milling has been the generally accepted method of ore reduction, with exceptions which are governed by peculiar local conditions.

Various grinding media have been tried from time to time, and rods were tried out in the old Marathon Mill many years before the war, but the results produced did not warrant further investigation at that time. Since the war, under certain conditions, Rod Mills have been put into practice, although a great deal of data is not available at the present time.

Quite recently in one of the installations of Rod Mills, the rods have been taken out to conduct a series of experiments with cast iron cubes, the idea being that cubes present a greater crushing surface than either rods or balls per unit. As experiments are still being conducted it is too early to comment.

Review

FUEL: SOLID, LIQUID AND GASEOUS. By J. S. S. Brame. London: Edward Arnold and Co. Pp. 388. 18s.

Naturally, the advances made in such a subject as the nature and use of fuel in ten years, real and important as they may be, absolutely do not bulk very largely when compared with all that was known at the beginning of the period. It is not, therefore, surprising that a large part of the present edition is simply a reprint of its predecessor. The additions are for the most part enumerated in the author's preface; they deal with ignition points of fuels, velocity of combustion of gaseous mixtures, low temperature carbonisation, the use of powdered coal as fuel and fuels for internal combustion engines. On all these questions the book has been brought up to date; and in every part of it, where work of importance has been done since the last edition was published, we find references to that work, if not a discussion of it.

The general plan and execution of the treatise merit nothing but praise. Professor Brame has at least one of the gifts of the teacher: he knows how to select the material that is essential or desirable, and how to arrange its presentation in a logical and assimilable form. The book is eminently readable, and whilst it displays the subject to the student with clearness, it is also a compact storehouse of facts and information to which the worker in any branch of the subject may need to appeal, and will seldom appeal in vain. The numerous references to original work, also, act as an efficient guide in the search for details too voluminous to be included in a general treatise of the size of this one.

Having said this, the most useful thing a reviewer can do is to draw attention to errors or (in his view) imperfections—not in any carping spirit, but with the hope of increasing the usefulness of an already very useful book.

The present position of low temperature carbonisation is well put before the reader, though in the list of processes the lead bath process of Caracristi, which the Ford works have adopted on a large scale, should appear, as it hardly comes within any of the other five categories.

The treatment of powdered fuel is considerably expanded and modernised, as compared with that in the last edition; but where the exposition of general principles is departed from and a particular system described, the Holbeck system is not at this time of day a very happy choice. For large installations, the Lopulco system as exemplified at Lakeside or Vitry, and for small ones unit pulverisers of the Turbo-pulveriser or Atritor type, would much better represent modern practice. And in the discussion on efficiencies in the chapter on power production, the advantages of powdered fuel, in respect both of the lesser amount of excess air which its use permits, and of the almost negligible stand-by charges, are so striking as to deserve mention.

In the tables of composition of coal on pp. 65 and 66, it would surely be better to speak of volatile matters, rather than volatile hydrocarbons: the 23·5 per cent. in "Navigation" coals, for instance, contains 7·5 per cent. which is not hydrocarbon at all. The dimensions of units are treated very vaguely: on p. 16, for instance, there is a direction to subtract a temperature from a quantity of heat, and in many places the expression "H.P. per hour" is used, where H.P. simply (which is a rate of doing work) is meant. On p. 106. the statement that a beehive oven carbonises six tons of coal in 72 hours seems inconsistent with its treating 20 to 24 tons per week, if the week is one of seven days. On pp. 282 and 283 there should be some indication that the cost of coal is not what it was in 1911, and that the cubic capacities of producers quoted are per H.P. On p. 294, in the table, the amount of heat recovered from the blast would be much better placed as a note to the amount used in heating the stoves: placed as it is it suggests a total of 114 per cent. In the first table on p. 298, the fourth figure in the last column but one should be 73 instead of 3·2. In the table on p. 300 the overall thermodynamic efficiency is given for the light and power and the traction sections, but not for the lighting section: this seems an omission; and in Mr. Tookey's comparison on p. 303 (where B.H.P., by the way, should be B.H.P. hour), the equalities in the last three lines are quite incomprehensible to this reviewer on the information given. At the top of p. 322, 20° should be 2°; and on p. 361 the misplacing of a semicolon entirely destroys the meaning.

A good many misprints occur, and a good many loosely constructed sentences and false concordances: "A summary are given," "If the conditions fails," "The viscosity must be high enough to remain in the distended condition," for example; and there are many misspelt proper names—Maumené, Dennstedt, Mabery, Simmersbach, Huntly, are all so maimed. There is also a Wellsian peep into futurity on p. 246, where we are told what happened at the end of the twentieth century. In all these respects the book needs thorough and careful revision, and the pity is that most of these things occur in the earlier editions, and might have been remedied in the present one. Whilst the merits of the book far override its defects, one may hope that Professor Brame will, in a fourth edition, see that no slur can be cast on the book in regard to its manner any more than its matter.

J. T. DUNN.

Chemical Exhibit at Wembley

New Features for 1925

THE British Chemical Industry will again this year occupy the same prominent position at the British Empire Exhibition at Wembley. As was the case last year it is being organised by the Association of British Chemical Manufacturers, a guarantee that it will be an interesting and comprehensive exhibit.

A number if new features have been introduced. The keynote this year will be information for the public. In a purely business exhibition, designed to bring buyers and sellers together, a chemical display necessarily consists of a large number of bottles containing samples of a thousand and one products which are made by the industry. This exhibit, however, will be designed mainly to interest the public and give the visitor some idea of the extraordinary part which chemistry plays in the national life. For example, instead of the individual dyestuff makers each having their own display, there will be a large combined exhibit of a very striking character. It will show, not only the immense variety of articles into which colour enters, but also what beautiful effects can be obtained by the use of dyestuffs made in this country. Again, the extended use of tar, which has made traffic on our roads just bearable, will be exemplified by a delightful country scene representing a country road efficiently treated with tar. When it is stated that Mr. Norman Wilkinson will be responsible for the designing and carrying out of these two exhibits, as well as of many others, it will be realised that something striking and effective will result.

The Scientific Section, which created so great an interest not only among scientists but among intelligent members of the public, will this year be remodelled. The public has now some idea of the position of this country as a leader in scientific research. It is proposed, therefore, to show how strikingly connected are the various stages from basic materials, familiar to everyone, to the finished product. This subject will be treated by taking as a basis coal, salt, and food. From the consideration of the raw coal the visitor will be taken through the various stages of distillation of coal, the products of such distillation, such as tar and ammonia, the treatment of tar and the resulting intermediate products which lead up to the manufacture of dyestuffs. The production of benzol, of disinfectants, of fine chemicals, of medicinal products, and of the numerous other chemicals obtained from coal will also be illustrated. The wonders of coal and its products are already partially realised by the public, but what do they know about salt or, indeed, of food? The scientists propose to tell them something about them.

New American Intermediate

DON W. BISSELL and Robert B. McCann, assignors to the National Aniline and Chemical Co., in *U.S. Patent* 1,509,413, announce the discovery of a new triphenylmethane compound and detailed methods of its preparation and isolation. It is made in general by condensing meta-hydroxybenzaldehyde with diethylaniline and then sulphonating the condensation product. The resulting substance appears to be a new disulphonic acid of 3-hydroxy-4′ : 4″-tetra-ethyldiamino-triphenylmethane.

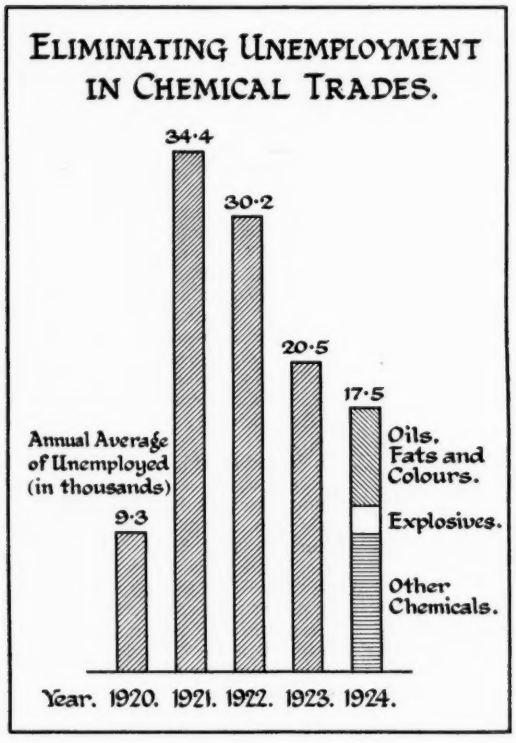
Employment Recovery in Chemical Trades

Statistics Show Marked Improvement

As an index to the prosperity, or otherwise, of an industry the periodical statistics which are issued in respect of unemployed workpeople are, within recognised limits, of undoubted use. In the various sections of the chemical trades movements can be fairly easily discerned from such figures, and a comparison of these over the post-war years is particularly satisfactory, inasmuch as the conclusion of the past year shows the numbers of unemployed chemical workers as having diminished considerably, and, moreover, good reason exists for the belief that we are now past the unparalleled disturbance of the years 1920–22.

The movement toward complete recovery has made considerable headway.

Normally, within Great Britain, there are 98,000 engaged in the production of chemicals proper, 16,000 producing paint and colours, 20,000 in explosive firms, and almost 80,000



employed in factories dealing with soaps, oils and fats. Of these totals, the seasonal fluctuations in demand in pre-war years used to interfere with the even course of production, by causing a 4·5 per cent. average unemployment. In an exceptional period, the proportion rose as high as 7·5 per cent., but the mean duration from the normal average was fairly negligible. We may therefore accept a 4·5 per cent. ratio of unemployment as the standard for later comparisons. Subsequent to the war period, the first two years reflected the strength of business in maintaining this figure in a fairly even manner. The exception, as was naturally to be expected, was with the explosive firms, where unemployment rapidly assumed a high proportion of 35 per cent. Smaller numbers of workpeople were, however, associated with this section, and unemployment here, when added to the 2,400 unemployed upon chemicals proper, resulted in a low figure for the industry as a whole. Under the influence of the general post-war awakening of world trade and the inflationary boom in home trade of the year 1920, unemployment in all sections could therefore be kept fairly low. Then with the opening months of 1921 a change began to come over the situation. The depression commenced suddenly and swiftly developed the intensity of its effects. By February of that year over 24,000 workpeople became entirely unemployed, and within two months this number had swollen to 32,000. The maximum figure was reached in the middle of 1921, and the total then recorded was 53,000. This was the period of the most acute conditions, as, in addition to the unemployed aggregate, as many as 25,000 workpeople were occupied on short time only and the industry was thus reduced by practically 33 per cent. of its full activity. This was the more surprising as such slight fluctuations as may be detected from statistics of chemical firms, in more recent months, indicate the summer as being the season of largest production. The year 1921 was, however, quite abnormal, and although the twelve months to June, 1922, following on the worst point of the trade slump, showed a diminution in the numbers upon short time, at no date during this period did the unemployment total fall below 30,000. The depression was severe, but the subsequent return to stable conditions is just as outstanding in character.

Sustained employment increases month by month are recorded and emphasise that really sound progress, devoid of artificiality, is being made. This applies with equal force to all sections. Oil and fat production, for example, for which separate figures are available since July, 1923, had on that date just over 7,500 unemployed workers and reduced this aggregate to 5,200 by the end of 1924. During the same period, paint and colour manufactures have had only about 600 unemployed workpeople, whilst the reduction in the explosive section has been from 2,400 to 1,600. The unemployment ratio for all chemical trades has thus been brought, by December, 1924, below 8 per cent., a figure which compares not unfavourably with the pre-war average. Moreover, the possibilities of full recuperation are most promising.

Taking the total unemployed at the end of the year 1921, the succeeding twelve months witnessed the absorption of approximately 30 per cent. into chemical firms, whilst by the end of 1923 another 20 per cent. entered employment, and throughout the past year the number was still further reduced by 7 per cent.

In other words, of the total unemployed of three years ago, less than half remain outside the industry to-day.

Alleged Improper Use of Letter

Motion by British Oxygen Co.

THE motion, adjourned several times, by the British Oxygen Co., Ltd., against Liquid Air, Ltd., came before Mr. Justice Romer in the Chancery Division on Wednesday.

Mr. Upjohn, K.C., for the plaintiffs, said that the object of the motion was to obtain an injunction restraining the defendants until trial or further order from publishing, printing, circulating, exhibiting or parting with, otherwise than to the plaintiffs, a letter dated December 17, 1924, addressed by the plaintiffs' Lancashire district agent to Tanks and Drums, Ltd., of Bradford, in which the agent set out the terms on which the plaintiffs were willing to supply oxygen to that company, and from allowing the letter to be published, or photographs or copies or extracts of it made, for the purpose of informing the public of the contents. The defendant company had had 12 photographs made of the said letter, and it was admitted that one of these photographs was sent to the defendants' company's brokers on the Stock Exchange with a request that it should be shown to others interested in dealings in the plaintiff company's shares. The immediate result was a fall in the value of the shares. The price quoted to Tanks and Drums, Ltd., for oxygen was a very special price at which they would not offer to supply small customers, but the quotation had been used by the defendant company to convey the representation that the effect of the defendant company's competition was such that the plaintiff company had had to reduce their price to one at which they could not possibly make a profit.

Sir Henry Slesser, K.C., for the defendant company, said it was denied that the photographs were shown about on the Stock Exchange. He said there was an issue in this case which could only be determined at the trial.

A number of affidavits were read on both sides, and the hearing was adjourned.

Chemical and Dyestuffs Traders' Policy

Protests against Administration of Protective Acts

THE second annual general meeting of the British Chemical and Dyestuffs Traders' Association was held at the Cannon Street Hotel, London, on Wednesday, March 25, Mr. Victor Blagden (Victor Blagden and Co., Ltd.), Chairman of the Association, presiding.

In presenting the report on the work of the year ended December 31, the CHAIRMAN said that as the conditions of trading in chemicals and dyestuffs in this country continued to be affected by various Acts of Parliament, the activities of the Association had been mostly in that direction without, however, expressing any political views for either the Association or himself. There was an almost general movement among manufacturers to abolish merchants as a body, not only in the chemical trade, but in others, and that this movement was strongly supported in high places must be obvious to all.

Grievances Under Safeguarding Act

The Key Industry Section of the Safeguarding of Industries Act continued in force, and the hardships which merchants and their customers, the consumers, had had to contend with were still in evidence. Unending trouble in passing goods through the Customs with undue delay and consequent loss to the importer and inconvenience to the customer, was met with every day. During the year, a considerable number of consignments of non-dutiable chemicals have been held up, sampled and analysed, and it was satisfactory to learn that the Association continued to minimise some of the waste of time and money by taking such cases up and obtaining the release of the goods sooner than would have otherwise been the case. The chief cause of this delay was the interpretation of the Act as reflected in the Board of Trade list of dutiable articles. In that list were hundreds of articles with "R" against them, signifying that the pure quality only was liable to duty, and that the commercial grade was outside the Act. The imports of the pure quality were negligible, if any, whereas the import of the commercial qualities in large quantities was an everyday occurrence. The Customs official dealing with an import of 10 or 20 tons of a chemical, found it scheduled for duty if of "R," or pure, grade. The fact that the material was in bags, and that such a quantity was not likely to be for laboratory work, or for medicinal purposes, and that the invoices specified the material as commercial quality, were matters that could not be accepted by him. Samples had to be taken and sent for test, and, after some days, sometimes weeks, the report came back "non-dutiable," and the goods were released. In the meantime, the importer had run up costs for demurrage on barges; he might have lost customers and the market might have gone against him. He was informed on good authority, that out of nearly 8,000 consignments held up and analysed under this legislation during one year, over 4,000 were returned as non-dutiable.

Another point was the question of ascertaining whether a particular grade of chemical would be liable to duty when imported. They had made inquiries at the Government Department concerned, asking what constituted "R" grade in respect of certain scheduled items, and in no single instance had a satisfactory reply been received. How could a merchant carry on his business when he was unable to ascertain whether the goods he was selling prior to importation were liable to this duty or not? How could he quote a prospective buyer in this country if he was not in a position to arrive at the cost of the goods landed?

During the year, there had been experienced the old trouble regarding the correct valuation of goods for the purpose of arriving at the amount of *ad valorem* duty payable. Naturally, an importer who had purchased a very large consignment, would be in a position to tender an invoice as evidence of value at a much cheaper price than an importer who had brought in a few hundredweights. Both invoices would show a value which, to quote the Act, "an importer would pay" and for that reason, one importer paid a heavier rate of duty than his competitor. A more serious point against *ad valorem* duties was that this system left the door wide open to collusion on the part of the shipper and an unscrupulous importer to agree upon ficticious invoices being tendered to Customs showing a value lower than that actually paid for the goods. In this respect, firms of repute in the chemical trade had suffered from unfair competition and the Revenue had been defrauded.

As British traders, they had no objection to an Act of this kind, provided its powers were strictly confined to key industries, but they strongly protested against such a piece of legislation being turned into a protective measure and applied to many hundreds of chemicals which had nothing to do with key industries, but which formed the basic raw materials in some of our chief exporting industries producing finished goods.

The Dyestuffs Act

This legislation had given dissatisfaction to merchants interested in dyestuffs, and the method of its operation left much to be desired. With respect to the disclosure to dyestuffs makers in this country of the consumer's name and other particulars mentioned on the merchant's application, it was admitted that this practice received the approval of the Board of Trade. Further, their suggestion that such action should not be taken by the Licensing Committee until the permission of the merchant and his customer had been obtained had been rejected, and they were given to understand that names of consumers mentioned on merchants' applications were liable to be circulated to trading interests outside the Licensing Committee directly they were obtained as—he was quoting from a letter from the Board of Trade—"it is considered to be of the utmost importance in connection with the development of the dyestuffs making industry in this country." It was a most vital point, and struck at the root of all trading. Did the Dyestuffs Act properly permit the Licensing Committee to force traders to hand over their business goodwill in that way? The Executive Council were not convinced there was the slightest necessity for the Licensing Committee taking the action complained of in order to enable them to arrive at a decision in considering application for licences. The Executive Council could not recommend members to accede to the Licensing Committee's request for the names of customers.

We have never, the chairman added, objected to the idea on which the Dyestuffs Act is based or its professed object. The Act prohibits the importation of dyestuffs except under licence. For the time being, we accept this position, so long as it is in the national interest, although it is open to question whether it is not unfair that in attempting to promote national interests, the whole burden should be put upon one particular section. Under such conditions, there is no possibility of regaining anything like our pre-war volume of exports in finished textile fabrics, etc. But we do object to the one-sided and prejudiced way in which the Act is being operated, and we claim that the merchant, as an essential link in the industry, should not be totally denied recognition on the Licensing Committee, and be generally ostracised and his interests entirely ignored. In other countries, such as America, where similar licensing systems are in force, detailed lists of licences granted are issued regularly, and it is a great pity the authorities will not do the same here.

Reparation Dyestuffs

During the past year, the Association assured the introduction of a special discount to merchants purchasing these colours for re-sale. They were grateful for this recognition of the merchanting factor, and could only hope it would spread to other matters connected with the dyestuffs position. During the year, they had circulated to members list of arrivals of these colours taken from Germany on reparation account. These lists had been furnished by the Board of Trade, and this was, a further admission that the merchant was a very necessary element in the dyestuffs industry. Importation in bulk quantities of dyestuffs as reparation "in kind" ceased at the end of the year, but there were very considerable and valuable stocks yet to be liquidated. These might well have been handled in a more business-like manner than had been the case. The agents appointed by the Government were the chief makers of the dyestuffs in this country, a peculiar appointment from a business point of view, and one

hardly likely to secure the quick sale and best results from these colours. The sale prices fixed for those colours, had throughout been on such a high level, that it had made them as unattractive as possible. He knew of no single exception where the dyes could not have been imported at a lower price than that charged by the Government for reparation stocks if importations were permitted, but as licences were not granted to importers for any dyes held in reparation stocks, users could not obtain that advantage. The injury it must do to consuming industries producing finished goods for export in competition with foreign makers who were able to get these dyes at economical prices did not appear to have been considered of importance.

Speaking o the general work of the Association, the Chairman said that during the year the membership had increased satisfactorily, but there were still a few firms, more especially in the North, who were not supporting the general movement. Without the merchant factor the consumer would very soon find he was bound hand and foot by combines. It would be to the general benefit of trade if manufacturers as a body concentrated their activities on improving their processes of production and on research work instead of speculating in raw materials and dealing in the products of other manufacturers, and left the intricate business of distribution to those who in the past had shown their capability to perform such services to the general benefit of all concerned for a very small toll indeed. The Government departments concerned should not take sides in this matter, but treat both parties alike. Both paid taxes and were good citizens.

Mr. Reynolds on Dyestuff Policy

Mr. F. T. T. Reynolds (vice chairman), who followed, dealt with the operation of the Dyestuffs Act. The majority of dye users in this country, he said, agreed that the development on comprehensive lines of a dyemaking industry in Great Britain was essential for industrial security, and a Departmental Committee appointed by the Government in their report recommended " that steps should be taken by H. M. Government to co-ordinate the operations of the principal manufacturers of dyestuffs so as to put an end to overlapping and dispersion of effort, and that such financial assistance as may be necessary should be given to them either by subsidy or by way of loan. We further recommend that the importation of foreign dyes should be prohibited except under licence to be issued by an independent authority, whose duty it would be, while fostering the growth and maintenance of the colour-producing industry, to safeguard the interests of colour users by means of the control it would exercise over the admission or exclusion of foreign dyes." In the light of war experience the Government definitely agreed to support the establishment of dyemaking here because of national security, and before the passing of the Dyestuffs Act an undertaking was given to the colour-using trades as follows: " It is the settled opinion of the Government that for national security it is essential that synthetic colour making factories should be in existence and be maintained in operation with their staffs of chemists and other experts in this country, and that the equipment should be equal in extent to that of any other possibly hostile nation. It is the settled opinion of the Government that this should be brought about without placing the textile and other colour-using industries in an unduly disadvantageous competitive position."

The consent of the majority of the colour users was obtained to this Act on condition that its incidence should not jeopardise the colour-using industries. The Act, however, coupled with the method of importing and distributing Reparation dyestuffs, was now seriously prejudicing our industries and jeopardising our export trade to a degree far transcending any benefit derived. Four years' experience of the Act and the manner of its administration had proved that an undue and unfair burden had been placed upon the textile trade generally and upon dye users particularly, in an only partially successful effort to accomplish a national purpose. The position was becoming more and more irksome and prejudicial.

The Price Problem

A high level of prices had been perpetuated, and the range and choice of dyes had been limited and restricted. Prices of dyes in this country varied from 50 to about 500 per cent. higher than prices paid by competitors abroad, and the average handicap could not have been less than 75 per cent. At the present moment large volumes of trade had been and were being diverted from this country to competitors in other countries who were able to buy their dyes without hindrance or restrictions and at prices so greatly in their favour. Indigo, for instance, was probably more used in this country than any other single dye, and might, therefore, be fairly taken as a key to the measure of the detriment sustained. Since the Dyestuffs Act was passed the price of indigo had on average been practically double the price current in each of the other countries producing similar finished goods. The present selling price of 20 per cent. synthetic indigo in Great Britain was 1s. 4d. per lb., against prices varying from 7½d. to 10d. per lb. in France, Italy, Belgium, Germany, United States, Canada, Japan, China, India and other countries more or less competitive with the United Kingdom in the world's trade in textile productions. If we took the lowest net price in the United Kingdom and the highest price current in any competitive country the minimum handicap amounted to at least £50 per ton. The consumption of indigo in this country even in the present state of trade might be taken as 2,000 tons per annum of 20 per cent. indigotin. This made a handicap as against any foreign competitors of £100,000 per annum. The value of 2,000 tons of 20 per cent. indigo at 1s. 3d. per lb. was £280,000. If the value of indigo might be taken on average as 10 per cent. of the cost of the finished textiles the total value of indigo dyed and printed textiles would be about £2,800,000. Of this value possibly £800,000 would be for home trade and £2,000,000 for export. Therefore the excessive price charged for indigo in this country jeopardised an export trade amounting in value to £2,000,000.

Suggested Plebiscite of Dye-Users

On March 10 the President of the Board of Trade informed the House of Commons that so long as the present Government remained in power they would carry out the Act in the spirit in which it was passed. But now, and for some time past, it had not been carried out, in relation to indigo and some other dyes, in such a spirit but had imposed a burden upon the users that was intolerable and had practically eliminated the traders. The President of the Board of Trade had led the House of Commons to believe that the users were satisfied and that therefore all was well. If the President of the Board of Trade wished to ascertain the real position he should arrange for a plebiscite of the dye users generally and possibly of the indigo users particularly. It would surely be of interest and value if each user were asked whether after four years' experience of the Dyestuffs Act he was in favour of continuance, repeal, free imports or tariff. The result of such a vote might be surprising, and if any change from prohibition of imports resulted, it would tend to revival of export trade, and revival was necessary for survival.

Artificial Silk: Patent Dispute

To illustrate the process of manufacture of artificial silk concerned in a patent case which came before Mr. Justice Eve in the Chancery Division on Monday, a film was shown in one of the consulting rooms of the court. The case is likely to occupy the court until the end of the term.

Courtaulds, Ltd., of Aldermanbury, are claiming the revocation of a patent granted to Lazare Drut, of which the legal owners are the Société Alsa Société Anonyme of Bale, Switzerland, for " improvements relating to the manufacture of artificial textile filaments " or the like.

Sir Arthur Colefax, K.C., for the Swiss Company, in opening the case, said M. Drut claimed for his patent filaments made from any suitable solution such as viscose, or celluloid. Courtaulds said that the owners of the patent were able to claim a monopoly in the manufacture of artificial silk by their process, and that filaments such as were specified in the patent were frequently manufactured and sold by Courtaulds prior to the date of the patent. They would be greatly hampered in their business and they and their customers would be exposed to the risk of infringement actions in using or dealing in artificial filaments as commonly manufactured and sold by them. They impugned the validity of the patent on the ground that the invention was not novel. Sir Arthur explained the process of manufacturing artificial silk. Mr. James Swinburne gave evidence in support of the plaintiff, and the hearing was adjourned.

The Trade Press as a Medium for Advertising*

By Sir Ernest Benn

It is particularly flattering for an Englishman to receive an invitation from the Editor of an American paper to write about advertising. I feel rather as if the Editor of the *Church Times* had asked my views on theology. As a publisher of trade papers I have frequently sought the assistance of authoritative American writers on advertising, but I do not remember ever contributing a line to the American press on this subject. I look upon America as the home of advertising, as the place where the art is really understood, and where it has been developed to a state of perfection. I go further. I attribute the wealth of America and the prosperity of its citizens very largely to advertising. Statisticians give figures showing the wealth of various countries, but I want no figures to tell me that the wealthiest countries are those which advertise, that wealth is distributed in proportion to the knowledge of advertising, and because America has this knowledge it is the country which heads the list in the matter of wealth. There is here a very great and very important difference between the Englishman and the American. The English manufacturer thinks he is very progressive if he allows when making up his cost account 5 per cent. for advertising, and then he wonders why his trade is in such a poor way. The American, on the other hand, understands that the selling of an article is as important and often as difficult as the making of it, and so, when he plans his manufacturing expenditure, he allocates a good round sum to selling and advertising.

Why Trade Paper Advertising is 100 per cent. Effective

As a trade and technical paper publisher, I shall be expected to hold the view that advertising in this class of publication is the best of all, but apart from my personal interest in the matter, that point of view is very easily substantiated. Trade paper advertising, from its very nature, is one hundred per cent. effective. If you advertise a food product in a food journal every reader of that journal is a potential buyer of that product. If, on the other hand, you advertise the same product in a popular daily journal you must reckon that three-quarters of your readers are business men and others who eat what is put before them, and never in the course of a month spend a cent on buying any sort of food product at all. So that there is no waste in trade paper circulation from the advertiser's point of view, and there are no media which can be used with a surer prospect of profitable returns. Again, the trade paper reader is very much more valuable than the reader of the popular press. He is a man in business who buys to sell again. If by advertising you sell a piano to a young couple getting married, you can reckon that account as finished and closed and you must start advertising in some other direction to find another young couple. If, on the other hand, you sell a piano through a trade paper to a music dealer, and that piano gives satisfaction, you can reckon on selling another piano to the same man every month for the rest of his business life. So that trade paper advertising is not only one hundred per cent. effective, but its effect is infinitely more powerful than any other sort of publicity.

Truth in Advertising

There is no need for any advertising convention to preach truth in advertising so far as the trade and technical press is concerned. It may in rare instances be possible to advertise without the assistance of truth in the public press to a public without technical knowledge. But it is a physical and literal impossibility to tell a lie in an advertisement in a trade paper. Your reader knows what you are talking about; he is as good a judge of the article as you are yourself. He wants its technical specification, its scientific points, the special features which distinguish it from other articles in the same line of business, but when it comes to essential statements as to quality and price it is impossible to deceive him. Thus it comes about that the standard of truthfulness and helpfulness in trade paper advertising is the highest standard obtainable, a fact which gives to this class of medium a selling quality and a pulling power that is unequalled in the whole realm of paper and print.

American and English Trade Papers Compared

A close comparison of American and English trade papers will disclose some very marked differences between them. The American journal will have a finish and a quality and a style upon the face of it which is often lacking in the English—better paper, better printing, better illustrations, better type display. The English trade paper will be much more crammed with matter. It will bulge with news, very uninteresting stuff to readers on the other side of the Atlantic. England is such a small place, so tightly packed together, that the members of a trade are known to one another personally, and so a trade paper is obliged to give a great deal of personal news and domestic information which would be out of place in a journal that can claim readers so widely separated as San Francisco and Boston. When it comes to technical articles there is probably not much to choose between the American and English trade paper, although we in England are conceited enough to think that we do that sort of thing rather better. We flatter ourselves that our matter is so good as not to need highly burnished paper and large type and pretty illustrations to sell it—but that is a point which is not worth pursuing, it might lead us into a study of all the many funny little differences between the two cousins. We take our trade paper for news and information, and we do not want it to look pretty, but when we buy a lawn mower it must be a work of art with the royal arms in gold on the front. The American buys a lawn mower to cut grass, and if it does that he will put up with the shoddiest of productions from the artistic point of view. Little differences like this make life interesting.

The biggest obvious difference between the English and American trade papers is that the advertising rates of the former are, roughly, half of those of the latter. Page for page and thousand for thousand the English advertising rates are seldom more and sometimes less than half the prices asked and paid in America. This is a condition of affairs that cannot last very long. Since we had a war and a thing called inflation, the printers and the post office between them have taken most of the profit out of trade paper production. Publishers are only waiting to see whether these high charges are likely to diminish, or whether it will be necessary to undertake a complete revaluation of trade paper advertising and get a good deal nearer to the American standards of rates.

Advantages of Mutual Advertising

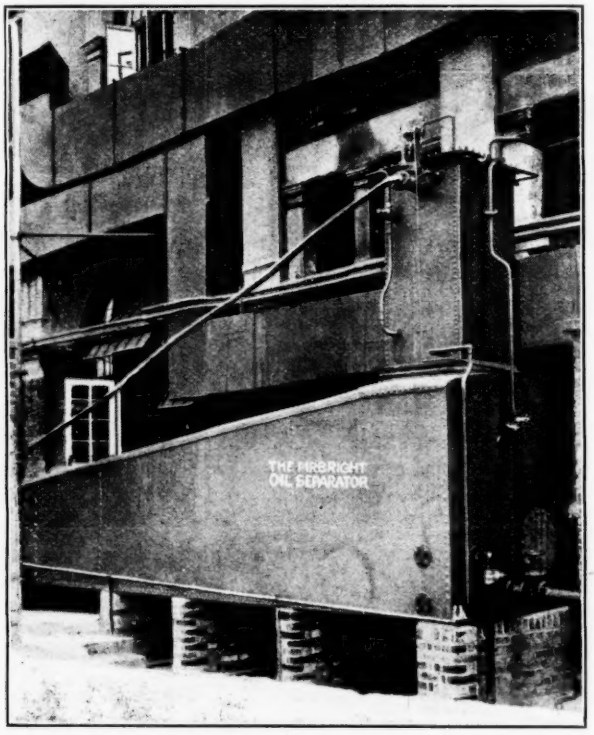
I suppose that no American or English publisher of trade papers is really very anxious to sell much advertising space outside his own country. He knows from experience how the home manufacturer has a way of resenting the appearance of the foreign advertiser. The protective mania which has always had such a strong hold in America and is getting an ever stronger hold in England can make it very unpleasant for the publisher who will admit to his pages more than a very small proportion of advertising from beyond his shores. But surely America and England, with all their many reasons for thinking alike and working together, could set an example in this matter which would greatly benefit the world's trade. Both American trade papers and English trade papers ought to be able to carry a good proportion of advertising from the other side of the Atlantic. Such a movement could do nothing but good. It could not fail to be highly profitable to the manufacturers who place the advertising; it would of course be profitable to the publishers, but these are the least of the advantages which would come from such a development. It would all help in the great work of bringing the English-speaking peoples together, while it might do something to teach the world at large that trade consists in exchange and that prosperity can only be developed through trade.

* From *Anglo-American Trade*, the organ of the American Chamber of Commerce in London.

The "Pirbright" Oil Separator

An Effective Device Based on Simple Principles

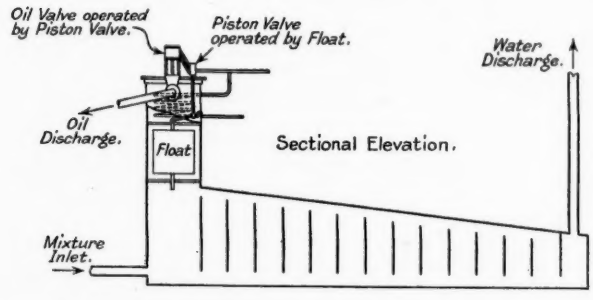
THE "Pirbright" oil separator is a remarkably simple and ingenious device, so much so, in fact, that when its operation is grasped one is inclined to wonder that it had not been invented before. The need for an efficient separator of oil and water, which has been met by this machine, arose with the increasing use of fuel oil for ships at sea, but once introduced, it has been found to be applicable to other uses, some of them



AN INSTALLATION AT FULHAM

in the chemical industry. The illustration on this page shows an installation at the margarine works of Messrs. Van den Berghs, Ltd., at Fulham.

The plant consists, as may be seen in the photograph, of a long tank provided at one end with a vertical extension which contains a float. At the other end is the water discharge pipe. Oil is discharged at the top of the float chamber. When the operation is started, the tank is filled with water



(or the heavier of the two liquids to be separated), and this lifts the float, cutting off the oil discharge valve by means of an auxiliary device worked by steam, compressed air or otherwise. The water discharge is so arranged that a pressure of two pounds per sq. in., or more, is obtained at oil discharge valve.

Mode of Operation

The oily liquid is then pumped in below, and the oil separates in the lower body of the tank and passes up, aided by the baffles, displacing the water from the float chamber. When the float chamber has filled with oil the float sinks, as it is so weighted as to lose its buoyancy in the lighter of the two liquids. The oil discharge valve is thus opened, and the oil flows out. The rising water then lifts the float again and cuts off the discharge. This proceeds automatically so long as the mixture continues to be pumped in. When pumping is stopped, the remaining oil discharges and the whole plant remains filled with water, ready for further service.

As the separator was primarily designed for the removal of oil from water discharged overboard from ships, the makers, who are the Pirbright Co., Ltd., of Bond Court House, Walbrook, London, E.C.4, have aimed at obtaining the water absolutely free from oil. In most cases, after passing through the separator, only a fractional percentage of oil remains, but, if it is desired to remove this, a special filter which has been devised for the purpose may be employed.

The Pirbright Filter

This filter is neatly designed, and a special patented filtering material is used. The liquid passes through the filtering pads under a low pressure, as little as four feet of water being sufficient. A point about the arrangement is that the pads are in parallel, and thus the maximum effect is obtained from a given batch of material. When the material has to be renewed the plates, distance pieces, etc., are easily removed, as they are welded together to form a single unit. The makers claim a 100 per cent. separation in this filter used in connection with the "Pirbright" separator.

It will be appreciated that owing to the simple mode of operation of the "Pirbright" separator, it can readily be used to separate any two non-miscible liquids, provided a stable colloidal emulsion has not been formed. By an extension of the system, it is possible to separate mixtures of more than one liquid, rendering the device applicable to a wider range of uses, including the handling of gasworks liquors.

The standard plant is made in various sizes ranging from capacities of 5 to 200 tons throughput per hour. The dimensions of the largest size are about 25 ft. by 21 ft., the height being as little as 4 ft. if necessary.

Traffic Charges

AT the usual monthly meeting of the Executive Committee of the Mansion House Association on Railway and Canal Traffic, held at the Association's Offices on Friday, March 20, it was decided that, as a result of the Deputation to the Ministry of Transport with reference to the extension of time for the completion of brake levers on both sides of wagons, to ask members of the Private Owners Waggons' Section of the Association to furnish supplementary information required, and to hold a meeting of representatives of this Association and the other bodies concerned, at the Association's Offices at an early date, for the purpose of co-ordination. Questions in relation to the Railway Rates Inquiry (Standard Revenue and Standard Charges), Increased Rates between Great Britain and Ireland, London Traffic Act (Road Transport), Owners' Risk Rates, Claims by Railway Companies on Traffic carted by Senders, Consignees or their Agents, Harbours, Docks and Piers (Dock Charges at Railway Owned Ports), were also under consideration, and as regards the question of Split Delivery Charges on Scotch and Irish Traffic by Coastwise Steamers, it was reported that, as a result of representations made on behalf of the Association to the shipping companies, considerable reductions in these charges had been obtained.

Hydrogenation Process

IN reference to the lecture on "The Hydrogenation of Vegetable and Marine Oils," by Mr. R. A. Bellwood, published in our issue of March 7, it should be stated that the process described therein is that of the Technical Research Works, Ltd. (Bolton and Lush's Patents). The manufacturers are Rose, Downs and Thompson, Ltd., Hull.

The Oil Palm in the East Indies

(From a Correspondent.)

Palm oil and palm kernel oil, two of the most important vegetable oils known to commerce, have been obtained hitherto almost entirely from the West African oil palm. Some years ago, however,—in 1911 to be exact,—a Belgian agricultural engineer established a small oil palm plantation on the east coast of Sumatra, and within four years 6,500 acres had been planted. The area, mainly in Sumatra, and to a less extent in Java, has been greatly extended in recent years, and a considerable industry has now developed. It may, perhaps, be a little premature to talk about the West African palm oil trade being seriously threatened, since the demand for these valuable oils is not likely to decline, but it may at least be affirmed that in some respects the East Indies have the advantage. In those islands the oil palm is grown almost entirely in plantations consisting of carefully selected trees, giving a larger yield of oil than the African palm, with the possible exception of those of Dahomey; whereas in West Africa the oil palm grows wild in immense forests, the fruit being collected by the natives and brought to the oil mills.

Development was interrupted during the war, but since 1918 planting has proceeded rapidly, and oil palms are now to be found on more than fifty estates in Sumatra, on nearly every type of soil, and at altitudes ranging from 30 to 1,500 feet above sea-level. In 1922 the total area was over 28,000 acres, and in Java 800 acres. In 1920 exports of palm oil amounted to 298 tons, in 1921 to 2,358 tons, and in 1922 to 2,544 tons. The industry is in the hands of large companies, mainly associated with Dutch margarine interests, and although they suffered severely during the vegetable oil slump a year or two ago they are rapidly recovering. Both the plantations and the oil mills are conducted on the most up-to-date scientific lines, with trained technical experts in charge, and should be successful.

Many of the rubber planters have taken a keen interest in the new industry, and have carried out a considerable amount of research. The General Experiment Station of the A.V.R.O.S. (Algemeene Vereeniging van Rubber-planters ter Oestkust van Sumatra) at Medan, during the past few years has carried out experiments in plant-breeding with a view to evolving a superior variety of oil palm yielding not only a heavier crop of fruit but also a higher percentage of oil per kilogram of fruit or kernel. Considerable progress has been made, too, in the design of the most efficient machinery and plant for the manufacture of palm oil (from the pericarp of the fruit) and of palm-kernel oil (from the kernel), and for hardening or hydrogenating the oil into a hard white fat. Refining methods have been improved.

Plant-Breeding and Higher Yields

In the plant-breeding experiment the aim has been to evolve a variety with a low percentage of useless shell, a high total yield, and breeding true to type.

The common type of oil palm in Sumatra is a good variety as regards total yield and purity of seed, but the percentage of shell, 30 per cent., is still higher than that of many other varieties in West Africa.

It may be mentioned here, parenthetically, that the great English companies interested in the West African oil palm are by no means neglecting the possibilities of scientific plant-breeding and systematic plantation methods. Several years, however, are needed for this work, since the oil palm must be at least four years old before it bears fruit.

In the planting of the young trees there is some difference of opinion as to the best spacing. As with most fruit trees, the highest yields are obtained—on the individual tree—with maximum spacing, but this does not necessarily mean highest yield per acre. In the East Indies the spacing varies between 20 and 30 feet each way, and this wide spacing raises the question whether the interspaces should be planted or merely kept clear of weeds. The planting of Hevea rubber as an intercalary crop between the rows has been tried, but is said not to have been very successful. On the other hand, certain varieties of coffee have been planted between the rows on numerous oil palm plantations in Sumatra, and have done very well where the conditions are similar to those of a rubber plantation growing coffee as a catch crop.

On the questions of manuring, pruning, and other problems, definite information applicable to different localities is still required, and is being slowly acquired by careful experiment.

Transport of the oil to Europe or to the U.S.A. is another difficult problem. Casks are not very satisfactory: there is considerable leakage of the oil, as the Sumatra palm oil is more liquid than that of West Africa, and the quality of the oil quickly deteriorates. Tank steamers have been suggested, but this is hardly feasible at present. Another recommendation is to harden or hydrogenate the oil. This is still a rather costly process, although it is largely carried out in Europe and America, and has proved most valuable for the soap-maker and other users of high-grade solid fat.

Society of Dyers and Colourists

New Reaction with Certain Diazo-Sulphonates

A meeting of the Manchester Section of the Society of Dyers and Colourists was held in the rooms of the Literary and Philosophical Society on Friday, March 20, Mr. J. Huebner presided, and a paper entitled: "A new reaction with certain diazo-sulphonates derived from β-naphthol-l-sulphonic acid," by F. M. Rowe, A. C. Burns, J. S. H. Davies, and Miss E. Levin was read by Dr. Rowe.

Dr. Rowe said that diazo-compounds condensed with β-naphthol-l-sulphonic acid in acid solution, forming stable diazo-sulphonates, which dissolved in a solution of a salt with an alkaline reaction, when one molecular proportion of the latter for each diazo group was used, and these solutions yielded the corresponding insoluble azo compounds derived from β-naphthol quantitatively with cold dilute mineral acids by elimination of the sulphonic group. This reaction had been explained by Bucherer in 1909, supported by Wahl and Lantz in 1923, as due to the conversion of the diazo-sulphonate into a diazo-oxide by the alkaline solution. The present investigation, commenced in 1918, arose from an observation made by Dr. Grant Hepburn that, whereas Para Red could be obtained by acidifying a solution of 4-nitrobenzene-2-naphthol-l-diazosulphonate in one molecular proportion of sodium hydroxide, this was not so when an excess of sodium hydroxide was used. In the later case an intense crimson colour was developed which disappeared gradually, and on subsequent acidification little or no Para Red was obtained, but a compound $C_{16}H_{12}O_7N_3SNa$ could be isolated in a yield of 91½ per cent.

Testing the Reaction

In order to test the generality of this reaction a large number of diazo-sulphonates had been prepared, using other diazotisable amino-compounds in place of p-nitroaniline. Each diazo-sulphonate was converted by sodium carbonate into a so-called diazo-oxide, many of which could be isolated in a well-crystalline condition, and all of which were converted into the azo derivative of β-naphthol by cold dilute mineral acid. Only certain of these compounds, however, gave rise to this new reaction with sodium hydroxide, for the compounds from aniline, o- and p-toluidine, 2 : 5-dichloroaniline, tribromoaniline, sulphanilic acid, p-aminoacetanilide, anthranilic acid, p-aminobenzonitrile, α- and β-naphthylamine, benzidine, etc., were decomposed whilst the compounds from o- and m-nitroaniline, dinitroaniline, p-nitroaniline-o-sulphonic acid, p-chloro-o-nitroaniline, p-nitro-o-chloroaniline, dibromo-p-nitroaniline, etc., behaved in a similar manner to the compound from p-nitroaniline. In fact, the only compounds not containing a nitro group, which had been found to give rise to this new reaction were p-aminoazo compounds, although this was not due to the presence of a reducible group.

From this point attention was confined to the compound, $C_{16}H_{12}O_7N_3SNa$ and the large number of its derivatives obtained by simple reactions. As a result of this investigation it was suggested that the so-called diazo-oxides were l-arylazosodium sulphonates of β-naphthaquinone, which, in certain cases, were converted by sodium hydroxide neatly into monosodium salts of 3-carboxy-N-arylimino-1 : 2-dihydroisoquinoline-l-sulphonic acid.

Experiments to test this hypothesis were still in progress and it was proposed that the paper should not be printed until they were completed.

Chemistry's Relation to Agriculture

The Chemical Control of Insect Pests

In the seventh lecture of the series on "Chemistry in its Relation to Agriculture," given by Mr. E. Holmes in the Chemistry Department of the Birmingham University, on March 18, the lecturer dealt with the problem of the control of insect and fungoid pests by chemical means. Although insecticidal and fungicidal spray materials could be classified according to the season of application, as dormant and summer sprays, it was probably better to consider them according to the purpose of application.

Insecticides were, therefore, usually considered under the heads of stomach poisons, or internal poisons which are applied to the foliage likely to be eaten by the insect; as contact or external poisons used for killing sucking insects; as repellants, for driving all insects from their natural food and so killing indirectly; and as fumigants, which killed all types of insects directly. The first class comprised the various arsenicals, Paris green (copper aceto-arsenite), lead arsenite and arsenate, and calcium arsenite and arsenate. Such compounds had to be in the insoluble form or they caused considerable damage by "scorching" the foliage of the plants treated. On the other hand, the insoluble salts were not direct poisons, but they became sufficiently soluble under the influence of the intestinal juices of the insect as to be absorbed by the tissues and so cause death. Such insecticides were used to control potato beetles, codling moths, caterpillars in general, and many other pests. Of the contact poisons, lime-sulphur made by boiling lime with powdered flowers of sulphur, soap solutions, paraffin emulsions, nicotine and nicotine sulphate were the chief. These were used to control insects which obtained their food by piercing the foliage of the tree or plant and sucking their nourishment from the inside, and so were not affected by the arsenical poisons applied to the plant surface. Such insecticides killed in various ways, by corrosion of the insect bodies as in the case of lime-sulphur; by dissolving the insect tissues as in the case of paraffin emulsions; by suffocation, by stopping up the tracheæ or air tubes of the insect, as was done by soap solutions; by the evolution of vapours which enter these tracheæ and upset oxygen assimilation as did paraffin emulsions and nicotine solutions; and finally by sticking the pest in one place on the plant, and so isolating it from its food. These contact insecticides were useful for the control of scale, aphids, and other soft-bodied insects. An interesting contact insecticide which had been used to a limited extent in America was nicotine oleate, which gave a sprayable emulsion having very good sticking properties.

Fumigation

Fumigation, where practicable, was shown to be the most effective method of combating insects. The agents employed were hydrocyanic-acid gas for white fly, snow fly, and red spiders, in glass house practice, and for the treatment of grain in elevators and bins; carbon bisulphide for weevils in grain, and for general glass house fumigation; and para-dichlorobenzene for killing larvæ in the soil about the roots of trees, and in hot house soils.

Fungicides, such as formalin and copper sulphate, were applied to the seed of grain before sowing, to control smut and bunt of wheat and barley, and the same agents or corrosive sublimate for scab of potato sets. Bordeaux mixture, a basic copper hydroxide, was extensively used as a fungicide for the growing plant, particularly for mildew of vines and blight of potatoes. Alkali sulphides and lime-sulphur were used as dormant fungicidal sprays.

An interesting case of control of pests by natural enemies was mentioned. From time to time earwigs had been conveyed in cargoes to New Zealand, where they threatened to become a great nuisance. This was due to the fact that the natural parasite which controlled the multiplication of these insects in England was not present in New Zealand in sufficient numbers. At the present time the entomological section at the Rothamsted Experimental Station was breeding these parasites for shipment to New Zealand.

Recent Wills

Dr. Horace T. Brown, F.R.S., of Evelyn Gardens, London, S.W.7, consulting chemist in the brewing industry £48,000

Mr. J. W. Spence, of Manchester, colour manufacturer £44,846

Soaps and the Theory of Colloids

Professor McBain at the Royal Institution

Professor J. W. McBain delivered a discourse before the Royal Institution of Great Britain, in London, on Friday, March 20, on "Soaps and the Theory of Colloids." He commented, in the first place, upon the excess of speculation from which the subject of colloids had suffered in the absence of precise and definite experimental evidence, and said that soap, as a typical colloid, had been chosen for a thorough study in order to supply the data required for testing or building up general theory. No general theory could be true if it were incompatible with the definite evidence provided by any one typical colloid. His general experience was that the more carefully a colloid was studied the less colloidal it was found to be.

The Micellar Theory

Attention was then drawn to what had become known as the micellar theory, which was deduced from a study of colloidal solutions. This theory resulted from the scientific work of Selmi and Nägeli, who had studied the subject of colloids for many years, and the work on soap strongly supported this micellar theory. The idea was that the colloidal unit was not the chemical molecule, but aggregates of the chemical molecule. Long ago, before colloids were recognised as a subject of scientific investigation, Selmi and Nägeli had both come to the conclusion that if colloidal matter were to be explained it could not be explained by assuming that the chemical molecule was the unit, but that there must be a larger unit, which Nägeli called the "micelle," and this micelle was the colloidal unit, the bricks out of which larger structures than colloids could be made. At the end of many years of experiment, Nägeli had concluded that a typical colloid like a starch grain was composed of a large number of these small crystalline particles. Professor McBain then showed an illustration taken from one of Nägeli's publications, showing what he (Nägeli) considered to be the micellar structure of a colloid such as starch. His conclusion was that the particles were crystalline. That conclusion, long neglected, had now received a great deal of support. He (the lecturer), however, preferred the conception shown by another illustration, which did not necessarily infer the crystalline micelle, but merely showed how these micelles could be put together to build up larger structures. It was a photograph taken from an observation on gamboge, which had been precipitated on a glass slide, and each of the colloidal particles which formerly existed in the solution were stuck to the glass. These colloidal particles reserved their individuality, while making up the larger units. The work on soaps strongly supported the micellar theory. There were two kinds of micelles in soaps, one highly charged, like an ion, called the ionic micelle, and the other nearly neutral. The latter were the bricks from which the larger structures were built up. Modern ideas of polarity explained the formation and stability of these micelles.

After exhibiting a number of diagrams showing the relative proportions of substances in soap solutions, he said there was a great family likeness between the various soaps. They differed in degree, but not in kind.

Referring to the testing of soap solutions by ultra-filtration, he said that this consisted of forcing a soap solution through a membrane—a sheet of cellulose material. The pores of this transparent material were so fine that they held back practically all the colloidal particles, and allowed only truly dissolved substances, such as salt and sugar, to pass through. The colloidal substances were held back probably on account of their size. By using different thicknesses of membrane, and getting pores of graded size—the very small pores holding back everything, and larger ones allowing first one constituent and then another to pass through—one could obtain a membrane which was just the right size to allow all the ionic micelles through and to hold back the neutral micelles, and in this way measure the exact amounts of each.

In conclusion, he said that if sufficient work was carried out on definite materials, ultimately there would be a theory of colloids which would be an exact science, in which every statement would be demonstrated, and subject to quantitative proof.

British Association of Chemists

The Economic Question

BOUND up with the complex question of economic justice to the profession, is the confusion that exists in the lay mind as to the nature of the work a chemist is able to do. Although very incompletely, it is now recognised that the chemist is a highly trained scientific worker, but few understand all that this implies. Such a question indicates the necessity of a discussion of the proper facilities that make possible efficient scientific service.

Among these facilities must be included, the salary which a chemist should receive, the equipment of his laboratory, and the staff at his disposal; and it will be convenient to deal with these in the order named.

At one period the Association seriously considered the advisability of the adoption of the minimum salary principle, but after protracted discussion, it was decided to abandon this policy. The Association was confident that it would have been able to obtain for its members a minimum salary, but it was held, and rightly, that an attempt to establish a fixed and unalterable precedent in this matter, involved the acceptance of a dangerous principle. A minimum salary may also be interpreted as a maximum salary, and upon that head alone, the formulation of too rigid a rule was judged to be inexpedient and unwise. At the same time the Association has asserted, and emphatically reasserts, that in ordinary circumstances, every properly trained chemist should receive at least £350 per annum.

To underpay the scientifically trained is the worst form of false economy. He who purchases a cheap article must, in general, run the risk of obtaining inferior quality; and what is true of matter is no less true of mind. The chemist has the fruits of his training to sell and he will give of them an amount equivalent to the price he receives. The economic law can no longer be confined merely to material production. The production of ideas is to-day as tangible a fact as the production of steel.

In regard to the equipment of laboratories, much valuable time is saved where the chemist is allowed a reasonably free hand. A satisfactory initial outlay will frequently make a difference between a failure, and the saving of a large annual sum. A badly equipped laboratory is uneconomical and in every way unsatisfactory.

It is as yet imperfectly understood that in all laboratories there are many operations purely of a routine character which any person after a short period of training is able to carry out. It is demoralising for the chemist, and in every way a very unsound principle to employ him upon such work, although it is obviously necessary that a chemist should supervise it. The chemist is thus set free to deal with those innumerable problems for which his training has specially fitted him.

We have endeavoured to show that economy in the payment of salary is, in our view, a false economy; that only by means of a properly equipped laboratory can a chemist do his best work; and that his employment as a routine worker is probably the worst economic blunder of all. It is one of the chief aims of the Association to ensure that these matters shall be satisfactorily adjusted, since only when the profession of chemistry finds its true place among the other learned professions will a rapid advance in pure and applied science be made.

H. T. F. R.

Export Trade in Salt

AT the annual general meeting of The Salt Union, held at Liverpool on Tuesday, the Chairman said that export trade showed improvement in face of numerous difficulties, and shipments to Calcutta totalled 92,500 tons of salt—very much the same as in 1923. To Japan and the West Coast of Africa exports had increased, and trade with European markets had been helped by the fact that German manufacturers' costs had increased owing to the introduction of the so-called gold mark. Shipments to Canada had slightly improved, despite fierce competition from producers in the Colonies.

A new product, "Salodine," has been placed on the market in the form of an iodised salt and had found favour with the medical profession. The outlook of the trade depended largely upon more favourable labour conditions.

Chemical Matters in Parliament

Chili Saltpetre

Mr. J. Beckett (House of Commons, March 12) asked the Minister of Agriculture what firms in this country were manufacturing sulphate of ammonia from Chile saltpetre and their total product; and what firms imported Chile saltpetre into this country.

Captain Hacking said that sulphate of ammonia was not manufactured from Chile saltpetre, and any process of the kind would be commercially impracticable. Chile saltpetre, better known as nitrate of soda, was largely imported for agricultural and other purposes. He was not in a position to give the names of the firms handling it.

Safeguarding of Industries

Sir P. Cunliffe-Lister (House of Commons, March 17) in reply to a question, gave a list of the trades from which applications had been received for safeguarding and which had been referred to committees. They included the following:—Gas mantles, glass bottles, scientific instruments, gold leaf, gold and aluminium bronze powders, and vulcanised fibres. An application in respect of superphosphates had also been referred to a committee of inquiry.

British Sugar (Subsidy) Bill

The House of Commons (March 18) passed the third reading of the British Sugar (Subsidy) Bill by a majority of 290.

Smoke Abatement

The Minister of Health (House of Commons, March 19), in reply to questions, stated he hoped to introduce a Bill on this subject next session.

Chemical Warfare Research

Sir L. Worthington-Evans, Secretary for War, (House of Commons, March 20), in a written reply to a question on the nature of the research and experiments relating to defence against chemical warfare undertaken at the Porton Chemical Warfare Research Department, stated that the research and experiments relating to defence against gas were directed towards the methods and appliances for individual and collective protection, and also towards the treatment of gas casualties. It was essential for the purpose of protection against gas to investigate the possibility of new gases and other forms of warfare which might be illicitly employed against this country.

The animals used for experimental purposes in 1924 were:—Goats 3, monkeys 4, cats 68, rabbits 445, guinea pigs 251, rats 166, mice 64, a total of 1,001. Of these 337 were actually killed as the result of the experiments, and the remainder were destroyed, not necessarily as the result of the effects of the experiments, but because it was the rule to destroy animals after they had been used for that purpose.

Carbon Black Imports

Mr. Samuel (House of Commons, March 23), in replying to a question, stated that the total quantity of carbon blacks registered as imported into Great Britain and Northern Ireland from all sources during 1924 amounted to 149,231 cwts., valued at £418,834.

Indigo Imports

Sir P. Cunliffe-Lister (House of Commons, March 24) in reply to a question, said that the only licences which had been granted for the importation of synthetic indigo were in respect of certain quantities imported on Reparation account in 1922 and 1923, under a special arrangement made at the time with the principal indigo consumers and with the British Dyestuffs Corporation.

Names of Imported Dyes

Mr. Crawfurd (House of Commons, March 24) in a written question asked the President of the Board of Trade whether, seeing that 75 per cent. of the applications for import licences under the Dyestuffs Act were received from dyestuffs merchants, and that it was the unanimous wish of these merchants that the names of all dyes for the import of which licences had been granted should be published, he would consider following the American practice of publishing the names at regular intervals.

Sir P. Cunliffe-Lister said that the suggestion was carefully considered by the Dyestuffs Advisory Licensing Committee some time ago, when it was decided not to publish the particulars in question.

From Week to Week

FIVE FATAL ACCIDENTS were reported in the chemicals, etc., industry during February.

ST. ANDREWS UNIVERSITY has decided to confer the honorary degree of LL.D. on Sir William Bragg and Professor F. G. Donnan.

DR. E. C. FRANKLIN was presented with the William H. Nichols medal at a meeting of the New York section of American Chemical Society, March 6.

DYE IMPORTS into the United States for February totalled 373,259 lbs., with a value of $365,268. The January figures were 393,525 lbs., valued at $350,265.

A NEW MOTOR FUEL, "Irolene," expected to be produced at a cost of about one penny a quart, was tested by experts in Paris last week. It is stated to have given results equal to petrol.

THE LATEST BULLETINS of the Cleveland Scientific and Technical Institution have been received, and offer in compact and useful form for reference abstracts of the most important scientific articles published during the period covered.

IN FULFILMENT of repeat orders, the Howden-Ljungstrom Air Preheaters (Land), Ltd., are delivering a large number of preheaters to the North Metropolitan Electric Power Supply Company's stations at Willesden and Brimsdown.

DISEASES OF OCCUPATION recorded during February included one case of mercurial poisoning and 14 cases of epithelimatous ulceration—5 in the pitch, 6 in the tar, and 3 in the oil industries. Four cases of chrome ulceration were reported, two in the dyeing and finishing industries.

APPLICATIONS ARE INVITED for the professorship of agriculture and the post of research physicist at Melbourne University. Conditions of the appointments may be obtained from the Agent-General for Victoria, Victoria House, Melbourne Place, London, W.C.2. The latest date for the receipt of applications is May 31.

GLASGOW GAS COMMITTEE recommends the appointment of Mr. James M'Leod (Lenzie) as manager of the chemical department in succession to Mr. W. A. Walmesley. Mr. M'Leod is chief chemist to James Nimmo and Co., Ltd., of Auchengeich Colliery, near Glasgow. The salary attached to the post is £1,000 a year.

THE TEXTILE INSTITUTE, MANCHESTER, has received a Royal charter of incorporation, granted by the Privy Council by letters patent under the date March 11, 1925. The charter will enable the institute, in addition to its other powers, to hold examinations and to grant certificates of competency to practise, teach, or profess textile technology.

THE MANCHESTER SECTION of the Society of Chemical Industry has decided to open a subscription list towards a testimonial to Mr. L. Guy Radcliffe, on his relinquishing the duties of secretary and treasurer of the society, in recognition "of the very great services which he has rendered during the past six years." Subscriptions, limited to 5s., may be forwarded to Mr. A. McCulloch, College of Technology, Manchester.

THREE RESEARCH ASSISTANTS are required at the Building Research Station of the Department of Scientific and Industrial Research, 16, Old Queen Street, London, S.W.1. Candidates must be honours graduates in chemistry or have an equivalent qualification, with some experience in research. One post requires a special theoretical knowledge of paints and varnishes, another of physical chemistry, and another of inorganic chemistry, a good knowledge of metallography, and ability to read French and German. Applications, upon a special form, must be received by, at latest, March 28 by the secretary.

A FILM dealing with the manuring of potatoes has been shown this year to the Branches of the National Farmers' Union in the chief potato growing districts in Great Britain, by Mr. G. A. Cowie, M.A., B.Sc., F.I.C., Chief Agricultural Adviser to the Potash Syndicate. The film was partly taken at the Rothamsted Experimental Station, and is intended to depict the results of the modern experiments and research work on the subject. It emphasises the point that a reduction in the percentage of phosphates and that an increase of the ammonia and potash would add materially to the efficiency of the average potato manure.

A NEW CHEMICAL and bacteriological laboratory is to be provided at Stafford at a cost of £34,000.

MR. E. O. JONES, B.Sc., has been appointed assistant lecturer in metallurgy at Manchester University.

A COMMISSION HAS BEEN APPOINTED to go into the question of fuel produced in, and imported into, Spain. All classes of fuel producers will be represented on the Commission.

UNEMPLOYED INSURED WORKERS in the chemical industry during February totalled 8,640—7,121 men and 1,519 women. This represents a slight decrease in both classes over the figures for the previous month.

MR. G. B. BROOK, chief chemist of the British Aluminium Co., lectured to the Birmingham Metallurgical Society on Thursday, March 19, on the subject of "Aluminium." He gave a survey of the methods of manufacture.

"EULAN," the German invention for the proofing of materials against moths, was the subject of a lecture by Mr. C. O. Clark, of the Society of Dyers and Colourists, to members of the Textile Association (Cartwright Club) at Leeds on Tuesday.

THE RULES OF THE ROAD and various phases of motoring from a legal aspect are subjects dealt with in *Road Risks Illustrated*, published by The Royal Insurance Co., Ltd., Liverpool. It is a handy book for all motorists, and includes mileage tables for all the principal towns.

PREVENTION OF BROKEN THERMOMETERS is stated to be obtained by the adoption of Cambridge Easy-to-Read thermometers in a concave metal shield. These instruments form the subject of a mailing card by the Cambridge Instrument Co., Ltd., 45, Grosvenor Place, London, S.W.1.

UNDER THE UNITED STATES BILL just passed for the amendment of the National Defence Act the chief of the Chemical Warfare Service is given the rank of Major-General. This is regarded not only as a compliment to General Fries himself but as an additional recognition of the importance of the chemical service which he has organised.

THE DEATH IS ANNOUNCED, at the age of 83, of Mr. Henry Edward Jones, of Ongar, Essex. He was chairman of the Wandsworth, Wimbledon and District Gas Co., with which company he had been associated for over 60 years. Mr. Jones was the first chairman of the Gas Companies' Protection Association, a past-president of the Institution of Gas Engineers, and a well-known figure in the gas industry.

AT THE ANNUAL MEETING of the Chemical Society in London, on Thursday, Dr. A. W. Crossley, of the Shirley Institute, Didsbury, was formally elected to the Presidency of the Society and installed in the the chair. A vote of thanks was passed to the retiring President, Professor Wynne, on the motion of Sir William Pope, seconded by Professor Philip, and tributes to the work of the new president were paid by several members.

AT THE ANNUAL GENERAL MEETING of the Edinburgh and East of Scotland section of the Society of Chemical Industry held in Edinburgh, on Friday, March 20, Mr. W. A. Williams was elected chairman, Major R. Bruce vice-chairman, and Mr. W. T. H. Williamson, B.Sc., was re-elected hon. secretary and treasurer. The following were elected to the Committee: Dr. Alexander Lauder, Dr. W. G. Ogg, Messrs. A. Cottrell, W. O. Kermack, W. A. MacGillivray, and J. Adam Watson.

GERMAN DYE MANUFACTURERS HOPE, says an unofficial report, that the more costly and complicated synthetic dyes will never be manufactured by England, the United States, Japan or Italy, at the same price and of the same quality as in Germany. At the present time the United States is manufacturing 95 per cent. of its own dye requirements, England about 80 per cent., Japan 50 per cent., and Italy 45 per cent. In 1913 the German dyestuff industry supplied 90 per cent. of the world's requirements.

AT THE ANNUAL MEETING of the United Alkali Co., held in Liverpool, on Wednesday, Sir Max Muspratt (chairman) reviewed the business of the year, and moved the adoption of the report and balance sheet. This was seconded by Dr. G. C. Clayton, M.P., and carried. Mr. Horace Muspratt, Mr. C. Hewitson Nelson, and Mr. W. Windus were re-elected directors, and the appointment of Dr. J. T. Conray and Mr. F. W. Bain as directors was confirmed. A report of the chairman's speech will appear next week.

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The nature of the hydrogen halides. A. Hantzsch. *Ber.*, March 11, 1925, pp. 612–641.

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ANALYSIS.—The detection and quantitative estimation of small quantities of fluorine. R. J. Meyer and W. Schulz. *Z. angew. Chem.*, March 5, 1925, pp. 203–206.

RING FORMATION.—The preparation of meta-condensed ring systems in the aromatic series. P. Pfeiffer. *J. prakt. Chem.*, January, 1925, pp. 41–58.

The formation and spectrochemical behaviour of hydronaphthalene derivatives. K. v. Auwers and K. Möller. *J. prakt. Chem.*, January, 1925, pp. 124–152.

RUBBER.—The constitution of rubber and a new rubber. H. Standinger. *Z. angew. Chem.*, March 12, 1925, pp. 226–228.

HAFNIUM.—The separation of hafnium from zirconium, G. v. Hevesy and E. Madsen. *Z. angew. Chem.*, March 2. 1925, pp. 228 230.

The atomic weight of hafnium; analysis of hafnium bromide. O. Hönigschmid and E. Zintl. *Ber.*, March 11, 1925, pp. 453–459.

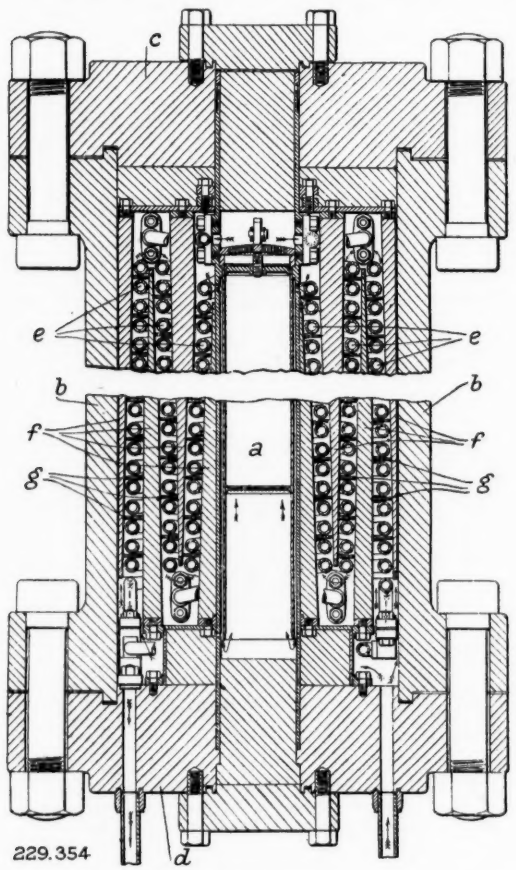
CELLULOSE.—The constitution of compounds of cellulose with metal bases. K. Hess. *Z. angew. Chem.*, March 12, 1925, pp. 230–232.

Patent Literature

Abstracts of Complete Specifications

229,354. Catalyst Furnaces for use in the Synthesis of Ammonia or Similar Gaseous Reactions or Operations, Construction of. H. C. Greenwood and W. R. Tate, University College, Gower Place, London, W.C.1. Application date, May 23, 1918.

In the synthesis of ammonia, the relatively small proportion of gas which undergoes conversion in a single passage over the catalyst may make it necessary to supply external heat to maintain the temperature. If this is done by external heating,



229.354

some risk is involved due to the exposure of the highly stressed metal to a temperature of 400°-700° C., and it is also necessary to employ carbon-free steel owing to the action of compressed hydrogen on carbon steel. The alternative of electrical heating is expensive, and the object in this invention is to reduce the cost of electrical heating by minimising the heat losses.

The furnace is provided with a central catalyst space *a*, arranged within a pressure resisting container *b* provided with covers *c*, *d*, and a heat interchanger surrounds the central space *a*. The interchanger comprises pipe coils *e* arranged in inclined rows so that they may be separated from one another, from the catalyst space, and from the outer vessel by tapered partitions *f* of heat insulating material. The incoming gases pass over the pipe coils on their way to the central chamber, and the outgoing hot gases pass through the pipe coils. Sections of the pipe coils may be connected in parallel, and may be separated by spiral plates *g* to produce a complete counter-current direction of flow for the gases. The use of the spiral baffles facilitate the assembling of the apparatus, since no friction occurs until the parts are in their final position.

229,359. Extracting or Recovering Tin from Ores or other Tin-Bearing Materials, Process for. T. Rondelli, 46, Callcott Road, Brondesbury, London, N.W.6. Application date, August 24, 1923.

The process is for treating slimes, residues, etc., having a content of tin too small to be treated by the ordinary processes. The process is applicable to materials containing down to 0·5 per cent. of tin. In separating the iron which is present in the material by chlorination, this process employs the principle of preventing the attack of the iron by keeping the temperature higher than the dissociation point of the volatile iron chloride. The process can be used with previously reduced ores or preferably with simultaneous chlorination and reduction. The tin-bearing material is heated to 600°-800° C. with carbon tetrachloride when stannous chloride is distilled off practically pure. In an example, the tin ore is first roasted to remove part of the arsenic, and then mixed with anthracite powder and heated to 750° C. Chlorine is passed over powdered anthracite in the same furnace, and then over the ore to distil off the stannous chloride. The process is not applied to ore or concentrates containing over 20 per cent. of tin.

229,399. Manufacture of Water Gas and other Cyclical Processes, Apparatus for use in. Humphreys and Glasgow, Ltd., and J. C. Stelfox, 38, Victoria Street, Westminster, London. Application date, November 22, 1923.

In the manufacture of water gas, it is necessary for the blow and run to follow one another at predetermined intervals, and in this invention automatic mechanism is provided for controlling or operating the actuating valves in proper sequence and at the proper time. If any valve sticks or does not complete its proper movement, the cycle is automatically stopped so that no succeeding valve can move. The danger of explosion is thus eliminated. At the same time, the apparatus automatically indicates which valve has failed to operate. In addition, if any valve does not move at the proper speed the cycle is automatically stopped, and the stoppage is also indicated. The apparatus also provides for the automatic shutting down of the plant, and the indication of this fact and of the valve which has failed. The plant may also be shut down automatically in the event of failure of power driving the automatic mechanism. The timing of any or all of the operating valves may be modified when required, to obtain the most efficient conditions for making water gas, and any of the operations can be transferred from automatic to hand control when required, the valves being interlocked to follow one another in the desired sequence. The mechanism is described in detail.

229,491. Vulcanisation of Rubber. The Peachey Process Co., Ltd., 83, Pall Mall, London, and S. J. Peachey, 44, Platt's Lane, Hampstead, London. Application date, February 23, 1924. Addition to 190,051. (See The Chemical Age, Vol. VIII, p. 42.)

Dissolved rubber is vulcanised by the interaction of sulphuretted hydrogen and sulphur dioxide in the rubber solution in the presence of 1 : 2-naphthoquinone (1 : 2-$C_{10}H_6O_2$) or toluquinone ($CH_3C_6H_3O_2$). The use of a small amount of naphthoquinone produces a considerable acceleration of the vulcanising, and the use of toluquinone produces a milder acceleration. Both these agents tend to reduce the quantity of free sulphur in the product. In an example, a 10 per cent. solution of rubber in naphtha was saturated with hydrogen sulphide, and then mixed with 4 per cent. of a 2·5 per cent. solution of sulphur dioxide in benzene. This mixture set in forty minutes. A similar rubber solution saturated with hydrogen sulphide was mixed with 15 per cent. of a 0·7 per cent. solution of 1 : 2-naphthoquinone in benzene, and the sulphur dioxide solution added. This mixture set in nine minutes. Several other examples are also given.

229,527. Drying China Clay and Argillaceous Materials, Apparatus for. C. A. Battiscombe, Old Vicarage, Charlestown, St. Austell, Cornwall. Application date, April 22, 1924.

In this apparatus, china clay is dried by moderate heat

applied in a partial vacuum. The clay is placed on a floor of fire-tiles in rectilinear sheet metal pans. Each pan is covered by a sheet metal cover having a depending rim provided with a number of sheet metal partitions dividing it into cells in which a partial vacuum may be maintained. The drying pans are supported by the flue walls so that the bottom plate 2 forms the cover of the flues through which combustion products are passed to heat the pans. The illustration shows a vertical section of a small part of one of the pans. The

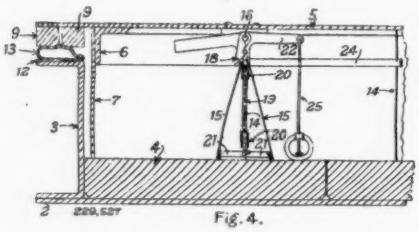


Fig. 4.

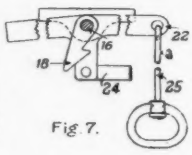


Fig. 7.

ide walls of each pan are composed of a channel section 3 and the bottom is lined with fire-tiles 4. The top plate 5 of the cover is stiffened by an angle section 6, and carries a depending rim 7 close to the channel section 3. The interior of the cover is divided into a number of cells by partitions 14 of the same depth as the rim 7, so that the lower edges of all the plates rest evenly on the tiles 4. Two strips of wood or metal 9 are fixed around the edge of the top plate 5, and a rubber tube 13 is compressed between these strips and a bent plate 12. The tube 13 may be inflated to produce an air-tight joint. Alternate partitions 14 are provided with wing plates 15, and a rod 19 is arranged to move vertically in guides 20. At the lower end of the rod 19 two bars 21 are provided, and are hinged to the rod 19 and wings 15. The rod 16 is fitted with hooks 18, and an actuating bell-crank lever 22 which is also hinged to the rod 24 connected to the mechanism in the other compartments. The interior of the cover is connected to a suction pump to assist the drying of the clay, and the cover carrying the dried clay is then lifted and transported to any required position. The rod 25 is then pulled downwards to release all the catches 18, and thus permit the closing of the wings 15 and discharge of the clay.

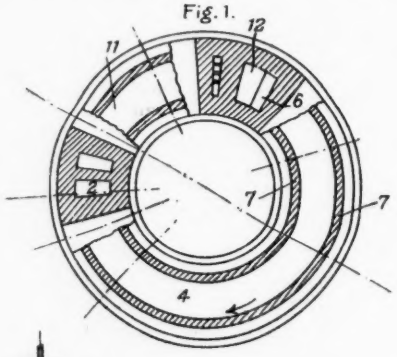
229,608. TREATING ORES AND THE LIKE. J. E. Greenawalt, 110, East 42nd Street, New York. Application date, November 5, 1924.

This process is more particularly for treating fine carbonate and sulphide ores. If carbonate ores are sintered without previous calcination, most of the fuel which is added to them is consumed in calcining the ore, and only a small proportion in sintering the ore. When sulphur ores are treated, the sulphur content acts as a fuel and partly smelts the ore. In this invention these disadvantages are avoided, and the ore is calcined and sintered in a single operation, and with the same amount of fuel which is usually required for sintering the ore. In sintering fine ores, a small proportion known as "returned fines" remains, and this is mixed with the fuel and water to form the upper layer when sintering carbonate ores; in the case of sulphide ores the "returned fines" are mixed with raw ore with or without limestone to form intermediate layers. In the application to carbonate ores, the bottom layer is formed of the coarser particles, the next layer of raw ore and fuel, and the top layer of "returned fines," fuel and water. The upper surface is then ignited, and the sintering effected by a downward current of air. The heat is sufficient to sinter the top layer and to calcine and sinter the lower layers, so that a homogeneous sinter is obtained. In the case of sulphide ores, the bottom layer is of crushed limestone, quartz, or an ore with a low sulphide content. The next layer is raw ore and "returned fines," with or without crushed limestone, quartz, etc., and the top layer is of raw ore alone. The sintering is effected by downward combustion as before.

229,560. GASIFICATION OF POWDERED FUEL, METHOD OF. H. M. Klötzer, Mosczinskystrasse 19, Dresden, Germany. Application date, July 9, 1924.

The apparatus is for obtaining water gas or producer gas from the residue remaining after the production of gas from bituminous substances. Dry coal containing little moisture, bitumen, and gas, *e.g.*, anthracite coal, may also be treated in this apparatus. The fuel is finely ground and blown into a closed chamber containing red-hot liquid slag which preferably flows in a stream through the chamber. In the production of producer gas, the proportion of air and carbon blown into the chamber may not be exactly uniform and local explosions may occur which will disturb the uniform production of gas. This may be avoided by adding incombustible gas to the powdered fuel. This addition of incombustible material also facilitates the production of water gas by its catalytic action. Fig. 1 shows a sectional plan of the apparatus and Fig. 2 a developed sectional elevation. Fuel dust and highly superheated steam are blown in through the passage 1, and mixed in the passage 2 by the reciprocation of the piston 3. The mixture then passes into the chamber 4 containing red-hot liquid slag 5 which supplies the heat for gasification. This is completed in the enlarged portion of the chamber 4, in which the speed of the gas is reduced, and slag is allowed to settle on the slag bath. The gas is drawn off through the passage 6. The trough 7 containing the slag is continuously rotated, and the cooled slag is reheated in the chamber 11 by the combustion of gas and air in that chamber admitted through the pipe 12. The chambers 4, 11 are

Fig. 1.



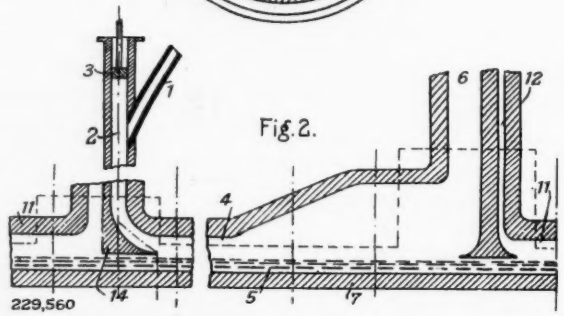


Fig. 2.

separated by the partition 14. By this process entirely dry producer gas may be obtained, and water gas may be obtained continuously.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—208,710 (Aluminum Co. of America), relating to electrolytic cells for refining metals, see Vol. X, p. 20 (Metallurgical Section); 209,423 (Industrial Reseinera Ruth Soc. Anon.), relating to camphene and iso-bornyl esters, see Vol. X, p. 276; 211,845 (Farbenfabriken vorm. F. Bayer and Co.), relating to manufacture of nitric acid, see Vol. X, p. 470; 215,373 (Farbenfabriken vorm. F. Bayer and Co.), relating to dyeing of acetate silk, see Vol. XI, p. 46; 215,737 (A. Wittig), relating to extraction of vanadium, see Vol. XI, p. 15 (Metallurgical Section); 216,120 (Soc. Lefranc et Cie), relating to manufacture of dipropylketone, see Vol. XI, p. 102.

International Specifications not yet Accepted

227,837. IRON MANUFACTURE AND CEMENT. E. C. Eckel, 1,503, Decatur Street, Washington, U.S.A. International Convention date, January 14, 1924.

Titaniferous iron ore is heated with limestone in a furnace having a hot blast, till the mixture fuses at 1,400°–1,500° C.

The iron is tapped off at the bottom and the slag at the top. The cooled slag is ground and then constitutes a cement consisting mainly of calcium titanate, TiO_2CaO.

227,839. SULPHURIC ACID. Soc. Anon. de Produits Chimiques de Droogenbosch, Ruysbroeck, Brussels. International Convention date, January 19, 1924.

Oleum containing 20 per cent. of sulphur trioxide is heated in a cast iron retort, and the liberated sulphur trioxide conveyed by acid-resisting glass pipes to absorbers containing distilled water or dilute acid. Pure sulphuric acid of any required concentration is thus obtained. Any traces of sulphur dioxide in the acid are removed by agitating with air.

228,115. FERRIC HYDRATE. J. B. Du Faur, Bobbin Head Road, Turramurra, New South Wales. International Convention date, January 21, 1924.

Solutions of iron salts or containing iron salts are mixed with calcium chloride, and the precipitated calcium sulphate filtered off. The chloride solution is treated with finely ground calcium carbonate, and oxidised by injecting air, to obtain ferric hydrate. Solutions of copper and cobalt salts may thus be freed from iron.

228,157. SYNTHETIC RESINS. Consortium für Elektrochemische Industrie Ges., 20, Zielstattstrasse, Munich, Germany. International Convention date, January 23, 1924.

Condensation products are obtained from acetylene and aliphatic and aromatic hydrocarbons such as methane, hexane, benzene, xylene, naphthalene, hexalin, also alcohols, glycols, phenols, chlorides, carboxylic acids, oxycarboxylic acids, halogenated carboxylic acids and their esters. Mercury and aluminium salts are added as catalysts, and acids and alkalis as activators. The products are of the cuprene or aldehyde resin type. In an example, acetylene is passed into an emulsion of mercury benzene sulphonate in glacial acetic acid, the mixture heated after absorption, and then leached to obtain a resin. In another example, an emulsion of amyl alcohol and mercury sulphate is treated with acetylene, and the product, after decantation, may be used as a lacquer or the amyl alcohol distilled off to obtain a resin. A solution of mercury acetate in hot phenol is mixed with concentrated sulphuric acid and treated with acetylene to obtain a semi-solid resin, or by further heat treatment a solid resin. Acetylene may be passed into an emulsion of aluminium chloride in benzene, the product mixed with water, and the benzene steam-distilled off to obtain a cuprene-like substance. A mixture of hexane and mercury sulphate similarly treated with acetylene yields a solid resin, and an emulsion of mercury sulphate with chlorbenzene yields a viscous product.

228,165. BARIUM CHLORIDE. Verein für Chemische and Metallurgischeproduktion, Aussig, Czecho-Slovakia. International Convention date, January 21, 1924.

A paste of barium sulphide and water is treated with sufficient hydrochloric acid to convert half the barium into chloride. The remainder is treated with alkali chloride to convert the barium hydrosulphide into chloride. The barium chloride is separated, and the liquor containing alkali hydrosulphide and chloride may be used for treating a fresh quantity of barium sulphide. This yields a stronger solution from which solid alkali hydrosulphide is obtained.

LATEST NOTIFICATIONS.

230,774. Heat process of manufacturing ferric oxide. Neill, O. S. March 12, 1924.

230,796. Manufacture of fertilisers. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. March 13, 1924.

230,821. Processes of mineral oil distillation. Sun Oil Co. March 17, 1924.

230,855. Manufacture of anhydrides of disaccharides. Pictet, A. March 14, 1924.

230,861. Production of artificial resins. Kulas, C., and Scheiber, Dr. J. March 17, 1924.

230,872. Manufacture of sulphurised compounds of phenols. Farbenfabriken vorm. F. Bayer and Co. February 9, 1923.

Specifications Accepted with Date of Application

208,699, 230,329 and 230,404. Albumen dyestuff products or compounds, Production of. P. C. Rushen. (*Haco Ges. Akt.-Ges. Bern.*) November 30, 1923.

208,711. Electrolytic refining of metals. Aluminum Co. of America. December 21, 1922.

208,712. Electrolytic cells for refining metals, Method of lining. Aluminum Co. of America. December 21, 1922.

212,943. Pure hydrogen gas, Process of and apparatus for the production of. J. H. de Graer. March 17, 1923.

214,261 and 223,192. 1-phenyl-2 : 3-dimethyl-4-dimethylamino-5-pryazolone, Manufacture of. G. Lockemann. April 10 and October 11, 1923. 223,192 addition to 214,261.

230,116. Anthraquinone derivatives, Production of. E. G. Beckett, J. Thomas, and Scottish Dyes, Ltd. September 3, 1923.

230,130. Silk, Dyeing of. J. S. Wilson, J. Thomas, and Scottish Dyes, Ltd. October 29, 1923.

230,167. Coking retort ovens. W. J. Mellersh-Jackson. (*Koppers Co.*) December 4, 1923.

230,180. Acids, Manufacture of. G. Guadagni. December 6, 1923.

230,217. Water gas, Production of. G. E. Whitwell. January 12, 1924.

230,223. Heat treatment of materials for distilling, dyeing, or carbonising them. Thermal, Industrial, and Chemical (T.I.C.) Research Co., Ltd., Sir A. M. Duckham, D. Rider, and J. S. Watts. January 17, 1924.

230,243. Gas washer-scrubbers. Kirkham, Hulett, and Chandler, Ltd., S. Hersey, and F. W. Stokes. February 9, 1924.

230,281. Carbonisation of coal. O. Y. Imray. (*S. P. Curtis.*) March 24, 1924.

230,293. Decolorising carbon, Process of manufacturing—and apparatus therefor. J. N. A. Sauer. April 5, 1924.

230,311. Light hydrocarbons, used as motor spirit, Process of treating—and for extracting and other purposes to prevent loss by evaporation. S. E. Page. (*J. H. Bregeat.*) May 9, 1924.

230,346. Hydrocyanic acid, Process for the manufacture of a product containing. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler and O. Liebknecht. August 1, 1924.

Applications for Patents

Aische, M. I. Manufacture of soaps. 7,128, March 17.

Bamford, A. C., and De Laval Chadburn Co., Ltd. Centrifugal separators. 7,330. March 18.

Beckett, E. G., Scottish Dyes, Ltd., Thomas, J., and Tonkin, R. Dyestuffs, etc. 7,097. March 16.

Bell, L. M. T., British Thomson-Houston Co., Ltd., Newbound, R., and Warren, H. W. H. Synthetic condensation processes. 7,587. March 20.

Bell, C. A., British Thomson-Houston Co., Ltd., Newbound, R., and Warren, H. W. H. Means for controlling chemical reactions. 7,588. March 20.

British Celanese, Ltd., and Ellis, G. H. Treatment of cellulose derivatives. 7,317. March 18.

British Synthetics, Ltd., and Higgins, E. B. Manufacture of azo dyestuffs, etc. 7,369. March 18.

Broadbent and Sons, Ltd., T., and Hallitt, W. Centrifugal machines. 7,526. March 20.

Chemische Fabrik L. Meyer. Seed-pickling preparations. 7,266, 7,267. March 18. (Hungary, April 19, 1924.)

Chemische Fabriken Kunnheim and Co., Akt.-Ges. Preparation of sodium-sulphide, etc., in small lumps. 7,244. March 17. (Germany, May 1, 1924.)

Colloisil Colour Co., Ltd. Filters. 7,343. March 18.

Durand et Huguenin Soc. Anon. Dyeing, etc., textile goods, etc. 7,594. March 20. (Germany, March 20, 1924.)

Eschingen, M. Ow-. Process of dissolving cellulose esters, etc. 7,106. March 16. (Austria, March 24, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Manufacture of sulphurised compounds of phenols. 7,251. March 17. (Germany, February 9, 1923.)

Fritzsche, H., Schaedeli, P., and Society of Chemical Industry in Basle. Manufacture of nucleal condensation products from α-naphthol and cyanuric halides. 7,595. March 20.

Ganahl, C. de., and Koch, F. C. Fractional distillation of hydrocarbons. 7,059. March 16.

Harris, J. E. G., Scottish Dyes, Ltd., Thomas, J., and Wylam, B. Preparation of dyes, etc. 7,235. March 17.

Köln-Rottweil Akt.-Ges and Opfermann, E. Process for bleaching cellulose. 7,467. March 19. (Germany, May 22, 1924.)

Kulas, C., and Scheiber, J. Production of artificial resins. 7,091, March 16. (Germany, March 17, 1924.)

Naugatuck Chemical Co. Manufacture of polymerised styrol and products obtained thereby. 7,710. March 21. (United States, July 12, 1924.)

Pirbright Co., Ltd. Separating liquids. 7,579. March 20.

Smith, J. Solution for neutralising corrosive effects of sulphuric acid. 7,528. March 20.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, March 27, 1925.

A FAIR business has passed this week, and on the whole the turnover shows an improvement over the last few weeks. The volume of business, however, still leaves a lot to be desired. All things considered, prices are astonishingly firm, stocks of most articles are very low, and there can be no doubt that any real improvement in business would quickly react upon the market. The export market is without special feature.

General Chemicals

ACETONE.—The improvement in the market has been maintained. A fair business is reported, price £75 per ton, ex wharf, London.

ACID ACETIC.—The first-hand situation is firm, but the market is disturbed by re-sale parcels, principally in the hands of weak holders. Technical 80% is £40 per ton; pure £42 per ton.

ACID CITRIC is very quiet. Buyers are showing a little more interest as the season advances, but the volume of business as yet is unimportant. Price 1s. 5d. per lb.

ACID FORMIC is in fair demand at £51 to £52 per ton for 85%.

ACID LACTIC is unchanged at £43 per ton for 50% by weight.

ACID OXALIC is in steady demand, the market is firm and price unchanged at 3¾d. per lb.

ACID TARTARIC.—There is quite a considerable amount of inquiry, and buyers seem to be very reluctant to commit themselves to the purchase of their requirements far ahead, due no doubt to the disappointments of the past two or three years. A comparatively small amount of buying would quickly influence the price.

ALUMINA SULPHATE.—A fair business is passing, and competition remains particularly keen; 17/18% is quoted at about £6 12s. 6d. per ton.

ARSENIC.—There is no business, and within limits the buyers can make their own terms.

BARIUM CHLORIDE is a quiet market, price about £10 15s. to £11 per ton.

COPPER SULPHATE is unchanged at £23 15s. to £24 10s. per ton.

CREAM OF TARTAR is a fairly good market, £76 to £77 per ton.

EPSOM SALTS is unchanged.

FORMALDEHYDE is rather quiet; price unchanged at about £43 per ton.

LEAD ACETATE is in particularly good demand. It is quoted £46 per ton for white and £44 per ton for brown.

LEAD NITRATE is unchanged.

LIME ACETATE is only a nominal market.

METHYL ALCOHOL is quiet, and price is firm at about £50 per ton.

POTASH PRUSSIATE is firmer at 8¼d. per lb.

SODA ACETATE is lifeless. The value is somewhat depressed on re-sales; present quotations are £21 to £21 10s. per ton.

SODA HYPOSULPHITE is without special feature.

SODA PRUSSIATE is unchanged at 4¼d. per lb. to 4½d. per lb.

SODIUM SULPHIDE has been more inquired for, and certain business has passed for export.

SODIUM NITRITE.—Quite a fair business is reported; price about £22 10s. to £23 per ton.

Coal Tar Products

There is no change to report in the market for coal tar products from last week.

BENZOL 90% remains unchanged at 1s. 8½d. per gallon on rails.

PURE BENZOL is also unchanged at 1s. 11½d. to 2s. per gallon on rails.

CREOSOTE OIL is slightly firmer, at from 6½d. to 6¾d. per gallon on rails in the North, the price in London being 7¼d. to 7¾d. per gallon.

CRESYLIC ACID is in slightly better demand. Owing to plentiful supply. However, there is no change in price, and the pale quality 97-99% is still offered at 1s. 9d. per gallon, in bulk, and the dark quality 95-97% at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA remains steady at 1s. 4d. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES.—The market remains inactive, the lower qualities being worth from £3 15s. to £4 5s. per ton, the 74/76 quality £5 to £5 10s., and the 76/78 quality £6 to £6 10s.

PITCH is unchanged. Prices are steady at 42s. 6d. to 45s., f.o.b. London, 40s. to 42s. 6d. f.o.b. East and West Coast ports.

Latest Oil Prices

LONDON :—LINSEED OIL dull and 10s. to 15s. lower. Spot, £46 15s.; March, £45 7s. 6d.; April and May-Aug., £45 12s. 6d.; Sept.-Dec., £44 12s. 6d. RAPE OIL nominal. Crude, crushed, spot, £48; technical refined, £51. COTTON OIL, quiet; refined common edible, £46; Egyptian, crude, £40 10s.; deodorised, £48. TURPENTINE quiet and unaltered; American, spot, 63s., and April, 63s. 3d. per cwt.

HULL :—LINSEED OIL.—Spot and March, £45 15s.; April and May-Aug., £45 17s. 6d.; Sept.-Dec., £44 15s. COTTON OIL.—Bombay, crude, £38; Egyptian, crude, £38 15s.; edible, refined, £42 10s.; deodorised, £45; technical, £41 5s. PALM KERNEL OIL.—Crushed, naked, £40 10s. GROUNDNUT OIL.—Crushed-extracted, £47; deodorised, £51. SOYA OIL.—Extracted, £37 10s.; crushed, £38 10s.; deodorised, £48. RAPE OIL.—Extracted, £47 per ton, net, cash, ex mill. CASTOR OIL and COD OIL unchanged.

Nitrogen Products Market

Export.—During the last week the demand for export has continued unabated and prices remain unchanged at about £13 10s. per ton, f.o.b. Most of the sales made have been for continental consumption. It appears that the more distant markets are fully bought for prompt shipment. The quantities available for export during April are very small, and if the demand continues on its present scale prices will be raised slightly.

Home.—Home orders are now beginning to pour in in considerable volume, and it is anticipated that they will take almost the whole British production for the next month or two. Home prices will remain unchanged until the end of May at £14 14s. per ton delivered to consumer's nearest station, in sellers' single bags, basis 21·1 per cent. nitrogen.

Nitrate of Soda.—The nitrate of soda market continues weak and resales have almost ceased for the last week or two. The severe weather has affected nitrate equally with sulphate. The only c.i.f. sales reported during the last fortnight are at £11 13s. and £11 14s. per ton, c.i.f. Antwerp/Hamburg. During the last day or two there has been a slight recovery in continental price. It is expected that large stocks of nitrate will be carried over to the new fertiliser season.

British Portland Cement Progress

MR. P. MALCOLM STEWART, managing director of the British Portland Cement Manufacturers, Ltd., at the general meeting held in London on Tuesday, said that the outstanding feature of the year's trading had been the steady increase in the home demand for Portland cement. This improvement became more marked towards the end of the year. The subsidiary companies also showed progress and the works in South Africa showed very satisfactory working and were declaring a dividend of 15 per cent. The extensive propaganda was at last interesting the public in cement and concrete construction and there were signs of still greater results in this direction.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—2¾d. to 3d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£16 to £17 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2¾d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—5d. per lb. Quiet demand. Crude 60's, 1s. 5d. to 1s. 7d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 8d. to 2s. per gall. Rather more inquiry. Pale, 95%, 1s. 7d. to 1s. 10d. per gall. Dark, 1s. 7d. to 1s. 9d. per gall.
Anthracene Paste 40%.—4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons. Supplies very scarce.
Toluol,—90%, 1s. 7d. to 1s. 7½d. per gall. More inquiry. Pure, 1s. 11d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. to 9d. per gall. Better demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. Steady demand.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 3d. to 1s. 7d. per gall. Demand good. Solvent 90/190, 1s. 4d. to 1s. 6d. per gall. Demand good. Market very firm.
Naphthalene Crude.—Demand rather better. Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand rather better. Whizzed or hot pressed, £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts.
Pitch.—Medium soft, 37s. 6d. to 42s. 6d. per ton, according to district. Not much business.
Pyridine.—90/160, 17s. 6d. to 18s. per gall. Market easier. Fair demand. Heavy, 11s. to 12s.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Business in dyestuffs has shown no further improvement and prices are not steady.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—11½d. to 1s. per lb. Price reduced. Improved demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7½d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
a-Naphthol.—2s. 3d. per lb. d/d.
B-Naphthol.—1s. per lb. d/d.
a-Naphthylamine.—1s. 3½d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—4s. 2d. per lb. d/d.
p-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5½d. to 5¾d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Market depressed. Short hours in Lancashire cotton trade are a handicap to business in acetates.

Acetate of Lime.—Brown £11. Quiet market. Grey, £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Acetone.—£78 per ton.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Fair demand.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. Only moderate market. 60% O.P. Solvent. 5s. per gall. 40% O.P.
Wood Tar.—£4 to £5 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£43 10s. per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7¼d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Cadmium Sulphide.—4s. 4d. per lb., according to quantity.
Carbon Bisulphide.—£32 to £35 per ton, according to quantity.
Carbon Black.—6d. to 6¼d. per lb., ex wharf.
Carbon Tetrachloride.—£62 to £67 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 4d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 7¼d. per lb.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s per ton.

Mineral Rubber "Rubpron."—£16 to £18 per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£56 to £65 per ton.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—5s 6d. per lb. Dearer.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£43 to £45 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 9d. to 3s. per lb., according to quantity. Market slightly easier.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity, for synthetic product.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4½d. per lb., less 5% for ton lots. Slightly upward tendency.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
Acid, Pyrogallic, Crystals.—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots according to quantity. Steady market.
Acid, Salicylic.—1s. 4½d. to 1s. 6d. per lb., according to quantity. Market rather easier.
Acid, Tannic B.P.—2s. 9d. per lb. Quiet steady demand.
Acid, Tartaric.—1s. 1d. per lb., less 5%. Very firm. Demand good.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 9d. per lb. Price lower owing to competition.
Amidopyrin.—13s. 9d. per lb. Slightly lower.
Ammonium Benzoate.—3s. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—11s. 9d. per lb. Price lower owing to competition.
Benzonaphthol.—4s. 3d. per lb. spot. Weaker. Demand quiet.
Bismuth Salts.—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
Bismuth Carbonate.—10s. 6d. to 12s. 6d. per lb.
Bismuth Citrate.—10s. 3d. to 12s. 3d. per lb.
Bismuth Salicylate.—9s. to 11s. per lb.
Bismuth Subnitrate.—8s. 8d. to 10s. 8d. per lb. according to quantity.
(The price of Bismuth Metal has been raised from 5s. to 7s. 6d. per lb. Bismuth Salts have been advanced accordingly.)
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 7d. per lb.; sodium, 1s. 8d. per lb.; ammonium, 2s. per lb. Slight upward tendency.
Calcium Lactate.—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
Chloral Hydrate.—3s. 10d. per lb., duty paid.
Chloroform.—2s. 6d. per lb. for cwt. lots.
Creosote Carbonate.—6s. 9d. per lb. Little demand.
Formaldehyde.—£42 10s. per ton, in barrels ex wharf London.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s per lb.; iron, 8s. 9d. per lb.; magnesium, 9s per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—7s. 10d. to 8s. per lb.
Hexamine.—2s. 9d. per lb. for cwt. lots. For bold crystal.
Homatropine Hydrobromide.—25s. to 30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon for makers' works, naked.
Hydroquinone.—4s. 3d. per lb. Nominal.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 11d. to 2s. 3d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £72 10s. per ton, less 2½%. price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 43s. 6d. per lb.; April delivery. Synthetic 26s. to 35s. per lb., according to quality.
Mercurials.—Market very quiet. Mercury slightly firmer. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
Methyl Salicylate.—1s. 7d. to 1s. 11d. per lb., according to quantity.
Methyl Sulphonal.—20s. per lb. Cheaper.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 2d. for B.P. quality. Keen competition has brought prices down.
Paraldehyde.—1s. 2d. to 1s. 6d. per lb., in free bottles and cases.
Phenacetin.—5s. per lb. in cwt. lots. Unsettled. Supplies exceed demand.
Phenazone.—6s. 3d. to 6s. 6d. per lb. Spot price lower than forward.
Phenolphthalein.—4s. 6d. to 5s. per lb. for cwt. lots.
Potassium Bitartrate 99/100% (Cream of Tartar).—83s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot; commercial, 8d. to 8½d. per lb., carriage paid. Slight reaction after recent advance.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—4s. 9d. per lb. In fair quantities. Supplies exceed demand.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. per lb., for cwt. lots. Slightly dearer.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb. From natural benzoic acid. Supplies of good quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate. Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity; 1 cwt. kegs included.
Sulphonal.—13s. per lb. accepted for quantity.
Thymol.—18s. per lb. Firmer.

Perfumery Chemicals

Acetophenone.—11s. per lb.
Aubepine.—11s. 3d. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 7½d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 7½d. per lb.
Benzaldehyde free from Chlorine.—3s. 1½d. per lb.
Benzyl Benzoate.—3s. 1½d. per lb.
Cinnamic Aldehyde Natural.—16s. per lb.
Coumarin.—16s. 6d. per lb.
Citronellol.—22s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—10s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. 6d. per lb.
Geraniol (Palmarosa).—28s. 6d. per lb.
Geraniol.—12s. 6d. to 20s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—15s. per lb.
Linalol ex Bois de Rose.—24s. 6d. per lb
Linalyl Acetate.—24s. 6d. per lb.
Methyl Anthranilate.—10s. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—37s. 6d. per lb.
Musk Xylol.—11s. per lb.
Nerolin.—4s. 6d. per lb.
Phenyl Ethyl Acetate.—15s. per lb.
Phenyl Ethyl Alcohol.—14s. per lb.
Rhodinol.—37s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. per lb.
Vanillin.—25s. to 25s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—13s. 9d. per lb.
Anise Oil.—2s. 6d. per lb.
Bergamot Oil.—16s. per lb.
Bourbon Geranium Oil.—22s. 6d. per lb.
Camphor Oil.—62s. 6d. per cwt. Cheaper.
Cananga Oil, Java.—11s. per lb.
Cinnamon Oil, Leaf.—6d. per oz.
Cassia Oil, 80/85%.—10s. per lb. Advanced.
Citronella Oil.—Java, 85/90%, 5s. 6d. per lb. Ceylon, 3s. 2d. to 3s. 5d. per lb., according to quality.
Clove Oil.—7s. 9d. per lb.
Eucalyptus Oil, 70/75%.—2s. per lb. Cheaper.
Lavender Oil.—French 38/40% Esters, 35s. per lb.
Lemon Oil.—3s. 9d. per lb. Advanced.
Lemongrass Oil.—5s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb. Again cheaper.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, March 26, 1925.

BUSINESS in heavy chemicals has been moderately good during the past week, but consumers are still not disposed to cover very far ahead. Prices on the whole are steady, a notable exception being potassium chlorate, which is scarce for near delivery and considerably advanced in price. Quotations for home products are practically unchanged.

Industrial Chemicals

ACID ACETIC.—Prices remain fairly steady. 96/98% glacial, £56 to £67 per ton, according to quality and packing; 80% pure, £42 to £44 per ton; 80% technical, £41 to £43 per ton, packed in casks delivered c.i.f. U.K. port.

ACID BORACIC.—Crystal or granulated £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 5½d. per lb. delivered. Offered for forward delivery at a fraction less.

ACID CITRIC, B.P. CRYSTALS.—In rather better demand; now quoted 1s. 4½d. per lb., less 5%, ex wharf. Spot material still available at about the same figure.

ACID FORMIC, 85%.—Unchanged at about £49 per ton, ex wharf, prompt delivery. Offered for early delivery at about £48 10s. per ton, ex wharf.

ACID HYDROCHLORIC.—In little demand; price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Slightly cheaper quotations from the continent; now on offer at about 3⅝d. per lb., ex wharf. Spot material quoted 4d. per lb., ex store, but could probably be obtained for less.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads; dearsenicated quality, 20s. per ton more.

ACID TARATARIC, B.P. CRYSTALS.—Unchanged at about 11¾d. per lb. less 5%, ex store.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot lots unchanged at about £7 5s. per ton, ex store. Offered from the continent for prompt shipment at about £6 12s. 6d. per ton, c.i.f. U.K. port.

ALUM.—Lump potash alum, spot lots, quoted £9 10s. per ton, ex store. Offered for early shipment from the continent at about £8 10s. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Price slightly cheaper at 1s. 5½d. per lb., ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb. delivered, according to quantities, containers extra.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £30 per ton, ex store, packed in casks. Bags £1 per ton less. Offered from the continent at about £25 15s. per ton, c.i.f. U.K. port. Fine white crystals quoted £21 2s. 6d. per ton, c.i.f. U.K. port, prompt shipment from the continent.

ARSENIC, WHITE POWDERED.—Spot lots quoted £32 per ton, ex store. Offered for early delivery at about £28 10s. per ton, ex wharf. Foreign arsenic quoted £25 per ton, c.i.f. U.K. port.

BARIUM CARBONATE, 98/100%.—Quoted £8 10s. per ton, c.i.f. U.K. port, prompt shipment from the continent.

BARIUM CHLORIDE, 98/100%.—Unchanged at about £10 15s. per ton, ex store. English material quoted £9 10s. per ton, c.i.f. U.K. port, prompt shipment from the continent.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station. Contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. port.

BORAX.—Unchanged. Granulated £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental rather easier at £3 15s. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER SULPHATE.—British material quoted £24 10s. per ton, f.o.b. U.K. port. Continental available at about £24 per ton, ex store. Offered from the continent at about £23 to £24 per ton, according to packages, c.i.f. U.K. port.

FORMALDEHYDE, 40%.—Spot lots quoted £43 10s. per ton, ex store. Offered for early delivery at about £40 per ton, c.i.f. U.K. port.

GLAUBER SALTS.—White crystals of English manufacture quoted £4 per ton, ex store or station. Continental on offer at about £3 10s. per ton, c.i.f. U.K. port.

LEAD, RED.—Now quoted £43 15s. per ton, ex store, spot delivery.

LEAD, WHITE.—On offer at £45 10s. per ton, ex store.

LEAD ACETATE.—Refined white crystals offered from the continent at £46 per ton, c.i.f. U.K. port, prompt shipment. Spot lots available at about £47 per ton, ex store. Dark brown quality quoted £39 10s. per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—Quoted £8 per ton, ex station, prompt delivery.

MAGNESIUM CHLORIDE.—Cheaper quotations from the continent; now on offer at about £3 10s. per ton, c.i.f. U.K. port.

POTASH CAUSTIC, 88/92%.—Unchanged at about £29 per ton, ex wharf, prompt shipment from the continent. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption 5d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Spot material quoted £25 10s. per ton, ex store. Offered from the continent at about £24 15s. per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Very little available for early delivery, and prices advanced to about 3½d. per lb., c.i.f. U.K. port.

POTASSIUM NITRATE, SALTPETRE.—Refined granulated 99% quoted £24 10s. per ton, c.i.f. U.K. port. Spot material available at about £28 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material now quoted 8d. per lb., ex store. Offered for early delivery at about 7¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Quoted 7¾d. per lb., ex store, spot delivery, in moderate demand.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken, 60%, £17 2s. 6d. per ton; powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £22 per ton, ex store, but could probably be obtained for less. Offered for early delivery at about £20 per ton, ex wharf.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Price for home consumption, 4d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 15s. per ton, ex station. Continental about £9 5s. per ton, ex store. Offered for forward delivery at about £8 5s. per ton, c.i.f. U.K. port. Pea crystals of English manufacture quoted £14 per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 17s. 6d. per ton, ex store; 96/98% refined quality 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Spot material on offer at about £25 per ton, ex store. Offered from the continent at about £23 5s. per ton, c.i.f. U.K. port.

SODIUM PRUSSIATE, YELLOW.—Quoted 4½d. per lb., ex store, but could probably be obtained at a fraction less.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, f.o.b. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers quote: 60/62% solid, £15 per ton; broken, £1 per ton more; flake, £2 per ton more. Crystals 31/34%, £9 5s. per ton, carriage paid U.K. stations; minimum 4 ton lots with slight reduction for contracts over a period. Continental material slightly cheaper. 60/62% solid offered at about £11 per ton, c.i.f. U.K. port. Broken, £12 per ton, c.i.f. U.K. port. 30/32% crystals, £8 5s. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton, ex store, prices nominal. American crude sulphur on offer at about £5 2s. 6d. per ton, c.i.f. U.K. port.

ZINC CHLORIDE, 96/98%.—Continental manufacture quoted £23 per ton, c.i.f. U.K. port. English material for export on offer at about £25 to £26 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Spot material now on offer at about £12 5s. per ton, ex store, but little demand.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Small home inquiries. Price, 1s. 3¼d. per lb.

NAPHTHIONATE OF SODA.—Some home inquiries. Price, 2s. 3d. for 100%.

ALPHA NAPHTHOL.—Good home inquiries. Price, 2s. 2d. per lb.
NAPHTHIONIC ACID.—Fair home inquiries. Price, 2s. 3d. per lb.
BETA NAPHTHOL.—Fair home inquiries. Price, 11½d. per lb.
METANILIC ACID.—Fair export inquiries. Price, 2s. 6d. per lb.
BENZIDINE BASE.—Fair export inquiries. Price, 3s. 9d. per lb., 100%.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, March 26, 1925.

IN some lines of heavy chemicals during the past week a slight weakening tendency has shown itself. These cases, however, are not very numerous, prices for the general run of products keeping fairly steady. Much about the same volume of business has been put through as during the last month or two, buying by home users being confined chiefly to small parcels. Overseas trade, also, is on a restricted scale. Few traders here are sufficiently optimistic to look for much improvement in the demand for chemicals in the immediate or near future.

Heavy Chemicals

Inquiry for prussiate of soda is still on a limited scale and quotations are easy, though at 4d. per lb. they are not quotably changed from last report. Bleaching powder is maintained at £9 10s. per ton, but there has been no perceptible improvement in the demand for this material. Caustic soda continues to meet with a quietly steady demand for both branches of trade and prices are firm; 60 per cent. strength is quoted at £15 12s. 6d. per ton and 76–77 per cent. at £18. Sulphide of sodium is in comparatively small request at £13 15s. to £14 per ton for 60–65 per cent. concentrated solid and £9 10s. per ton for crystals. Saltcake is about unchanged at £3 15s. to £4 per ton, but only a small amount of business has been done. Glauber salts are also quiet at £3 10s. per ton. Alkali is firm and in fair inquiry at round £6 15s. per ton. Acetate of soda is dull and quotations have an easy tendency, to-day's value being about £20 per ton. The demand for chlorate of soda is limited, but prices are unchanged from last week at 2⅝d. per lb. Hyposulphite of soda is steady at £13 10s. to £13 15s. per ton for photographic crystals and round £9 10s. per ton for commercial. Soda crystals are still on offer at £5 5s. per ton and a fair volume of trade is being done. Bicarbonate of soda is rather quiet at about £10 10s. per ton. The demand for phosphate of soda is still restricted but prices continue on the basis of £12 10s. to £13 per ton. Bichromate of soda is steady and in moderate request at about 4d. per lb.

Among potash compounds the demand for caustic is still only moderate and values are easy at £29 to £30 per ton for 90 per cent. material. Carbonate of potash, on the other hand, is steady and in fairly active inquiry at £24 10s. to £25 per ton. Bichromate of potash is in quietly steady request and prices are maintained at 5d. per lb. Permanganate of potash is inactive, with quotations varying from 6¾d. to 7¾d. per lb. according to quality. Chlorate of potash is quiet but unchanged from last report at 2¾d. per lb. Prussiate of potash is being called for in small quantities; values are easy at 7d. to 7¼d. per lb.

The demand for sulphate of copper is of moderate dimensions though values have not changed much, £24 15s. per ton being currently quoted. Arsenic shows little indication of recovering from the extreme depression that has characterised it for some considerable time, and prices are again easier; white powdered, Cornish makes, is now offered at about £30 per ton in Manchester. Nitrate of lead keeps fairly steady at £41 to £42 per ton. Commercial Epsom salts are in moderate request and values are maintained at £4 15s. per ton; magnesium sulphate, B.P. quality, is quoted at round £6 5s. Acetate of lime is still offering at £15 10s. per ton for grey material and round £10 for brown. Acetate of lead is in quietly steady demand at about £46 10s. per ton for white and £42 for brown.

Acids and Tar Products

Tartaric acid is still quoted at about 1s. per lb., though the inquiry for this material is not very active. Citric acid is steady at about 1s. 4½d. per lb. Oxalic acid is maintained at its recent improved level, 3¾d. per lb. still being asked. Acetic acid is rather quiet at round £40 per ton for 80 per cent. commercial quality, and £67 to £68 per ton for glacial.

Coal-tar products generally are quiet and little movement either up or down has occurred this week. Pitch is quiet at 40s. to 42s. 6d. per ton. Naphthalenes are only in moderate demand at about £15 per ton for refined and from £4 15s. for crude. Carbolic acid is dull at 5d. to 5¼d. per lb. for crystals and 1s. 7d. per gallon for crude. Solvent naphtha is quoted at 1s. 5½d. per gallon and creosote oil at 6¾d.

American Market Movements

(From *Drug and Chemical Markets.*)

HEAVY chemicals continue quiet but steady with a large volume moving to consumers. Price increases are due to large available supplies of practically all materials. Intermediates quite soft with shading reported on quite a number of items. Light oils continue strong with benzene firm at recen advance.

Linseed oil sharply lower during the week with other vegetable oils steadier and stronger. Soya bean oil scarce. Animal oils firm with increased steadiness in lard, red oil and neatsfoot oil. Cod oil in fair request and menhaden improving.

Fine chemicals are generally quiet with exception of mercury and bismuth preparations. Menthol firm. Domestic makers of citric acid control situation.

Essential oils are in small demand, but at same time prices remain firm. Oil peppermint steady at $15.00. Oil cedar wood lower. Oil lavender firm.

German Chemical Market

(FROM A CORRESPONDENT.)

BUSINESS has almost stopped, as no interest exists. Quotations for caustic potash were maintained at $13.50, as larger quantities were not on hand. Caustic potash, packed in 50 kilo drums, for prompt delivery, was not obtainable in larger quantities; lots for April shipment were traded at £16. Chlorate of potash keeps its upward tendency as offers are scarce; business was done on a basis of $12.50. Chloride of calcium was offered in parcels of 15 tons at £3 7s. Quotations for tartaric acid were unchanged. Lots sold for later shipment were called off promptly, so that goods for immediate delivery could not be obtained. The price for April delivery was quoted at $50. Citric acid was sold in quantities of one ton at £145. The demand for oxalic acid, which was somewhat satisfactory during the last weeks, has abated considerably. Chloride of barium was quoted at £8 3s. 6d. for lots of 5 tons. Offers for naphthaline in flakes and balls were made at £13 10s. There was a rise in price for Epsom salts, owing to the co-operation of manufacturers. Lots were not on sale for less than £3 2s. 6d. Potash chrome alum was quoted at £17 10s. Larger quantities of iron sulphate in original casks were offered at £2 16s. 6d. Ammonia carbonate powder was on market for £25 5s. Bicarbonate of soda could be obtained at £9 12s. During this period of report, manufacturers have raised their prices for carbonate of potash by 10 per cent. This product, 96/98%, is traded at $11.30, whilst factories quote $11.40.

Mr. T. W. Stuart Honoured

MR. T. W. STUART, general technical manager of the United Alkali Co., Ltd., was on Wednesday, March 18, initiated an honorary member of the Boilermakers' and Iron and Steel Shipbuilders' Society in the presence of a representative gathering of Merseyside members of this trade union. Mr. Stuart, who has been with the United Alkali Co. since its formation in 1890, and has also held his present position for the past 30 years, is well known in the chemical industry as a highly successful labour expert, as proved by the fact that the company have had no strikes worth mentioning during that period. Supervising the wages and working conditions of the employees of the United Alkali Co., he has necessarily had wide experience in dealing with trade unions, and has gained the complete confidence of the leaders and men.

The Boilermakers' and Shipbuilders' Society is one of the oldest in the country, and a very unusual course has been adopted by conferring upon Mr. Stuart the honorary membership of the organisation.

Company News

BURT, BOULTON AND HAYWOOD.—The directors have declared an interim dividend of 1s. per share, being 5 per cent. actual, against 4 per cent. a year ago.

RIO TINTO CO.—The directors recommend a final dividend at the rate of 40s. per share, making 50 per cent. for the year. The sum of £470,000 is carried forward.

BRITISH OIL AND CAKE MILLS, LTD.—The payment of a dividend of 8 per cent., less tax, on the ordinary share capital is recommended for the year ended December 31 last.

THARSIS SULPHUR AND COPPER CO., LTD.—A dividend of 10 per cent., equal to 4s. per share, less tax, is recommended from the profits of 1924. After writing off £18,804, the directors propose to carry forward £31,300.

BRIMSDOWN LEAD CO., LTD.—At the annual meeting held in London on March 20 the report and accounts were approved and a resolution was passed sanctioning a merger offer made by the Associated Lead Manufacturers.

RHODESIAN AND GENERAL ASBESTOS CORPORATION.—An interim dividend of 7½ per cent., less tax, on account of the year ending March 31, is announced, payable on March 30 to shareholders on the register on March 23.

BARRY OSTLERE AND SHEPHERD, LTD.—The directors have decided to recommend a dividend of 15 per cent. with a bonus of 2s. per share on the ordinary capital, both less tax, for the year ended January 31 last. The sum of £100,000 has been placed to reserve, £33,250 to special depreciation written off, and £122,401 is carried forward.

MASON AND BARRY, LTD.—The directors have, subject to completion of audit, decided to recommend at the general meeting of shareholders, to be held on April 27, the payment of a dividend out of profits for the year 1924, of 3s. per share, or 15 per cent., less income tax, and to carry forward to next account £28,371, subject to corporations profits tax.

SOUTHALL BROTHERS AND BARCLAY.—The report for the year 1924 shows a profit of £31,672, which, with £25,170 brought forward, makes a total of £56,842. The directors recommend a dividend on the ordinary shares at the rate of 10 per cent. per annum, free of tax, and a bonus of 6d. per share on the ordinary shares, free of tax; placing to reserve £10,000; carrying forward £27,922.

GRAPHITE OILS.—The accounts for the year 1924 show, after deduction of depreciation, a net profit on the year's working of £3,279. The report states that notwithstanding adverse conditions the management have been fairly well able to maintain the turnover. The directors propose to carry £1,000 to preliminary expense account and the balance of £2,279 (subject to corporation tax) to reserve. This will increase the company's total reserves to approximately £7,500.

LIQUID AIR, LTD.—The profit for the year ended December 31 last (with the reserves previously made), after making full allowance for depreciation and bad debts, amounts to £4,226, which, after providing for income-tax and corporation profit tax liabilities, and together with the balance brought forward, leaves available for distribution £8,041, out of which the directors recommend a dividend of 12½ per cent. which will absorb £3,522, leaving to be carried forward £4,518. The annual meeting will be held at Winchester House, Old Broad Street, London, on March 31.

AMERICAN CELLULOSE AND CHEMICAL MANUFACTURING CO., LTD.—The report of the directors states that the company's factory at Cumberland, Maryland, U.S.A., was substantially completed and brought into operation during the latter part of 1924. The production has steadily increased, and it is expected that the plant will be in full operation by the coming midsummer. The company has imported and sold large quantities of British made "Celanese" amounting to more than £250,000 over the past several months. The work of the past year has again convinced the directors of the soundness of the company's enterprise, and they look forward to a prosperous future for the manufacture of "Celanese" products in America. No profit and loss statement is included in the report, as silk production did not commence on a commercial scale until the end of the year, but such a statement, it is added, will be included in future reports.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Mark can be lodged up to April 18, 1925.

"MOLLIT."

455,377. For chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. Chemische Fabriken Vorm. Weiler-ter-Meer (a joint stock company organised under the laws of Germany), Rheinuferstrasse, Uerdingen, Niederrhein, Germany, manufacturers. January 15, 1925.

Opposition to the Registration of the following Trade Marks can be lodged up to April 25, 1925.

"VITREX."

454,949. For chemical substances used in manufactures, but not including paints or varnishes, and not including any goods of a like kind to paints or varnishes. Class 1. Borax Consolidated, Limited, 16, Eastcheap, London, E.C.3, merchants. January 1, 1925. (To be Associated. Sect. 24.)

"KILSOL."

453,780. For liquid and powdered disinfectants. Hull Chemical Works Company, Kirkby Street, Kingston-upon-Hull, soap and disinfectant manufacturers. November 19, 1924.

"PACO."

453,349. For asphaltum, bitumen, coal tar and coal tar pitch. Class 4. Franz A. Pabelick and Co., Kaiser Wilhelmstrasse 20 to 36, Hamburg, Germany, manufacturers. November 6, 1924. (To be Associated. Sect. 24.)

"COLMAC."

454,820. For tar and bitumen cold emulsions for use in road making. Henry Ellison, Limited, 110, Dowsholm Road, Maryhill, Glasgow, tar and ammonia distillers. December 29, 1924.

"VITREX."

454,950. For raw, or partly prepared, mineral substances used in manufactures, not included in other classes. Class 4. Borax Consolidated, Limited, 16, Eastcheap, London, E.C.3, merchants. January 1, 1925. (To be Associated. Sect. 24.)

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

OILS, PAINTS, ETC.—Tenders invited by Falkirk Town Council for the supply of pitch and pitch oil, paints, oils, cement. Tenders to Town Clerk by April 6.

PAINTS, OILS, GREASE, ETC.—Tenders invited by Glasgow Corporation for the supply of paints, oils, grease, lime, cement. Tenders to Town Clerk by April 2.

CHEMICALS, ETC.—Tenders invited by Westhoughton (Lancs) Town Council for supply of pitch, creosote oil, tar for tar spraying, lubricating oils, paraffin, petrol, benzol, lime, disinfectants. Details from Mr. G. Hayes, surveyor.

Tariff Changes

SWITZERLAND.—The new import tariff is fully listed in *The Board of Trade Journal* for March 19.

UNION OF SOUTH AFRICA.—The whole of the duty on acetic acid imported for use in the tanning and textile industries is to be rebated.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry make no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

CHLOROPHYL CHEMICAL CORPORATION, LTD., 116, Charing Cross Road, W.C. (C.C., 28/3/25.) £21 1s. 4d. February 19.

NATIONAL PETROLEUM CO., Abbey House, Westminster, oil merchants. (C.C., 28/3/25.) £17 4s. 11d. February 18.

WHITE BAND MANUFACTURING CO., LTD., 20, Pumppail, Croydon, manufacturing chemists. (C.C., 28/3/25.) £16 7s. 11d. November 24.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

RHODES (JOHN R.) AND CO., LTD., Manchester, oil refiners. (M., 28/3/25.) Registered March 10, £1,100 mortgage, to W. Paterson, 5, Cross Street, Manchester, solicitor; charged on Park Oil Works, Cowburn Street, Cheetham. *——. December 19, 1924.

TAYLORS' DRUG CO., LTD., Leeds. (M., 28/3/25.) Registered March 12, £1,000 mortgage, to Mrs. G. Ashworth, 5, Greek Street, Leeds; charged on 215 and 215A, Layton Road, Blackpool. *£111,744 0s. 11d. September 12, 1924.

London Gazette

Companies Winding Up Voluntarily

SEMOLINA CO., LTD. (C.W.U.V., 28/3/25.) By special resolution February 4, confirmed February 26, F. V. Hansford, Parr's Bank Buildings, 3, York Street, Manchester, chartered accountant, appointed liquidator.

WYKE DYEING CO., LTD. (C.W.U.V., 28/3/25.) E. Jarville, Towngate, Wyke, near Bradford, accountant, appointed liquidator, March 10.

Notice of Dividend

SWITHENBANK, Harold, of 132, Beeches Road, West Bromwich, analytical chemist. Seventh dividend, 1s. per £, payable March 18, Official Receiver's Office, 191, Corporation Street, Birmingham.

Order Made on Application for Discharge

MANGOLD, Louis Augustus, and MANGOLD, Charles Bernard, 17, Harp Lane, London, trading as Mangold Bros., chemical merchants. (O.M.A.D., 28/3/25.) Date of Order February 20, 1925. Discharge suspended for 2 years until February 20, 1927.

New Companies Registered

BRITISH STANDARD LUBRICANTS, LTD., Lower Church Lane, Dudley Port. Oil importers, blenders, refiners and merchants, dealers in grease, paints, varnishes, etc. Nominal capital, £2,000 in £1 shares.

COLAS PRODUCTS, LTD., 38 and 39, Parliament Street, London. Distillers and manipulators of asphalt and bituminous substances, animal and vegetable fats and oils, manufacturing chemists, etc. Nominal capital, £400,000 in £1 shares (100,000 7 per cent. cumulative preference and 300,000 ordinary).

LION TALC AND GRINDING CO., LTD., Sardinia House, Kingsway, London. Crushers, winners, smelters, calciners, refiners and preparers for market of talc and all other kinds of ore, metal and mineral substances, etc. Nom. cap., £23,000 in £1 shares.

WILLIAMSON AND HOGG, LTD.—Wholesale, manufacturing and analytical chemists, etc. Nom. cap., £6,000 in £1 shares. Solicitors: Brown and Holliday, 53 and 54, Camden Street, North Shields.

Lever Brothers: Alleged Breach of Contract

In the Chancery Division on Wednesday, Mr. Justice Russell began the trial of an action for damages for alleged breach of contract brought against Lever Brothers, of Port Sunlight, by Mr. Axel Wallenberg, Swedish Minister to the United States.

Sir John Simon, K.C., for the plaintiff, said that by the contract sued upon, Lever Brothers had bound themselves to acquire from Mr. Wallenberg a large block of shares in a Swidish company known as Barnangens Kemiska Fabrikers Aktiebolaget (chemical manufacturing company). After the contract in this case was entered into—and it might well be because of Levers' breach, as the plaintiff alleged—the company went into liquidation in March, 1921. The nature of the contract was that the plaintiff undertook to sell and procure the transfer to Lever Brothers of this very large block of shares and Lever Brothers undertook to accept them from him on terms. In December, 1920, Lever Brothers repudiated the contract.

One defence to the action was that there was no contract.

The hearing was adjourned.

British Celanese Changes

BRITISH CELANESE, LTD., of 8, Waterloo Place, London, state that Sir Harry McGowan, K.B.E., has agreed to vacate the chairmanship to enable the appointment of a whole-time chairman. Major-General Dawnay, C.B., and Mr. R. A. Murray, C.A., at the unanimous invitation of the board, have agreed to join the board, and Major-General Dawnay has accepted the position of whole-time chairman. Mr. A. W. Tait, C.B.E., has resigned from the deputy-chairmanship, and both he and Sir Harry McGowan, with all the other English directors—Sir Trevor Dawson, Bt., Sir James Dunn, Bt., Sir Philip Henriques, K.B.E., Sir Josiah Stamp, G.B.E., Mr. J. H. Stephens, F.C.A., and Mr. Charlier, of the Turbize Co., have placed their resignation in the hands of the new chairman, with a view to giving him complete liberty of action, including, if need be, a reconstruction of the board.

Sweden's Dye Needs

SWEDEN does not offer a big market for coal-tar dyes, according to the American Consulate in Stockholm. The total consumption in 1923 amounted to 1,290 metric tons. No serious efforts ever seem to have been made to establish a dye industry, because of the strong competition and insufficient natural resources. The country's needs are supplied by importation, chiefly from Germany. The dye-consuming industries are textile and paper mills, tanneries, dyeing and renovating shops, and fur establishments. Germany led in the Swedish coal-tar dye market, total imports in 1923 amounting to 1,337,130 kilos, valued at 7,726,649 crowns—an increase of 47 per cent. in quantity over the previous year. A number of vegetable dyes are used in the leather trade.

Chile Nitrate Exceeds Demand

TOTAL exports of nitrate from Chile in January were 255,000 tons, against 300,000 tons in December and 300,000 tons a year ago. Shipments to European ports in January were 140,000 tons, against 127,000 in January, 1924, and 161,000 before the war. A total of 1,000,000 tons were exported to Europe during the first seven months of the fertiliser year, against 810,000 tons a year ago. Nitrate production in January increased to 215,000 tons, against 194,000 in 1924, 133,000 tons in 1923, and against the war peak of 208,000 tons in 1914. Current output is at the rate of 2,580,000 tons per annum—more than the world's total consumption.